RADIO TEST REPORT

Test Report No.: 10402743S-E-R1

Applicant	:	**Anritsu Corporation**
Type of Equipment	:	**Network Master Flex**
Model No.	:	**MT1100A**
FCC ID	:	**OCS-MT1100A**
Test regulation	:	**FCC Part15 Subpart C: 2014**
Test result	:	**Complied**

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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This report is a revised version of 10402743S-E. 10402743S-E is replaced with this report.

Date of test: August 14 to September 3, 2014

Representative test engineer:

H. Shirasawa

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Leader
Consumer Technology Division

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REVISION HISTORY

Original Test Report No.: 10402743S-E

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10402743S-E	September 16, 2014	-	-
1	10402743S-E-R1	October 8, 2014	- (Full revision)	- Correction of 4.2 - Addition of data of average output power

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SECTION 1: Customer information

Company Name	:	Anritsu Corporation
Address	:	5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Telephone Number	:	+81-46-296-6669
Facsimile Number	:	+81-46-225-8380
Contact Person	:	Yasuyuki Oishi

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Network Master Flex
Model Number	:	MT1100A
Serial Number	:	Proto-17
Rating	:	AC 100 - 240V, 50/60Hz DC 16V/14.4V (Battery)
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	July 30, 2014
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: MT1100A (referred to as the EUT in this report) is Network Master Flex.

Clock frequency(ies) in the system : 20 MHz, 200 MHz, 625 MHz

<Bluetooth part>

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	79MHz & 1MHz
Type of modulation	:	GFSK, π/4DQPSK, 8DPSK
Antenna type	:	Dipole
Antenna gain	:	3.0dBi
Antenna connector type	:	IPEX MHF Connector (U.FL compatible)
Operation temperature range	:	0 to +40 deg.C.

<Wireless LAN part>

Equipment type	:	Transceiver
Frequency of operation	:	2412-2462MHz
Bandwidth & channel spacing	:	20MHz & 5MHz
Type of modulation	:	CCK,OFDM
Antenna type	:	Dipole
Antenna gain	:	3.0dBi
Antenna connector type	:	IPEX MHF Connector (U.FL compatible)
Operation temperature range	:	0 to +40 deg.C

* For Wireless LAN part, refer to the test report: 10402743S-D-R1.

FCC 15.31 (e)
The stable voltage (DC3.3V and DC1.8V) is provided constantly to RF part via regulator. Therefore, the EUT complies with the requirement.

FCC 15.203
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore the EUT complies with the requirement.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2014, final revised on May 1, 2014 and effective June 2, 2014
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	1.5dB Freq.: 0.20395MHz Detection: Average Phase: N Mode: Tx 2402MHz, DH5	Complied
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A	0.6dB Freq.: 918.467MHz Polarization: Vertical Detection: Quasi-Peak Mode: Tx 2402MHz, DH5	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	-	Conducted	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

* Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Item	Frequency range	No.1 SAC*1/SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.8 dB	5.0 dB	4.8 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB
Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.6dB
Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.4dB
Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.8dB
Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB
Bandwidth measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
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Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☒ No.1 semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.2 semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☒ No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☐ No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☒ No.1 measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

Test item	Operating mode	Tested frequency
Conducted emission	Transmitting Hopping OFF (DH5 / 3-DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Carrier frequency separation	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 - DH1, - DH3, - DH5 - 3-DH1, - 3-DH3, - 3-DH5	-
	-Inquiry	
Maximum peak output power	Transmitting Hopping OFF , Payload: PRBS9 - DH5, - 2-DH5, - 3-DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz Spurious emission: 2402MHz, 2441MHz, 2480MHz
(Radiated)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	
99% occupied bandwidth	Transmitting (DH5 / 3-DH5), Payload: PRBS9 / Inquiry -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.
The carrier separation may be less than 20 dB bandwidth, therefore 125mW power limit was applied to it.

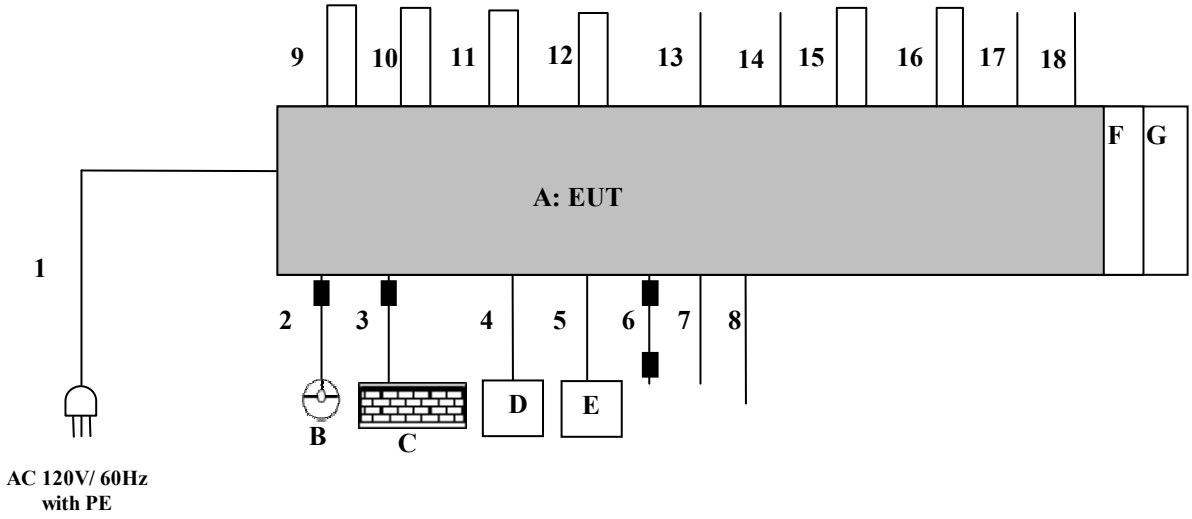
Software : Tera Term version 4.80
Power Settings : 15 (maximum value)

We removed 2-DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3-DH mode (3 Mb/s EDR: 8DPSK) as a representative.

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

4.2 Configuration and peripherals

■ : Ferrite core



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Network Master Pro	MT1100A	Proto-17	Anritsu	EUT
B	Mouse	MSK-1113(B)	91705-523-8274115-11121	Microsoft	-
C	Keyboard	L100	CN0RH6576589076	DELL	-
D	Head Set	HL-108	-	DELTACO	-
E	GPS Receiver	GPS19xLVC	19S093144	GARMIN	-
F	10G Multirate Module	MU110010A	Proto-1	Anritsu	-
G	Battery and AC Power Supply Module	MU110001A	Proto-3	Anritsu	-

List of cables used

No.	Item	Length (m)	Shield	Remarks
1	AC	2.6	Unshielded	-
2	USB (Mouse)	1.8	Shielded	-
3	USB (Keyboard)	2.1	Shielded	-
4	Audio (Head Set)	1.8	Shielded	-
5	AUX (GPS Receiver)	5.0	Shielded	-
6	USB mini	1.0	Shielded	-
7	Coaxial SMA (Reference clock output)	1.0	Shielded	-
8	Ethernet (Service interface)	2.0	Unshielded	Cat.5e
9	Port 1 Bantam (DS1: Tx-Rx)	1.9	Shielded	-
10	Port 1 Coaxial BNC (E1, E3, E4, DS3, STM-1-e, STS-3e: Tx-Rx)	2.1	Shielded	-
11	Port 2 Bantam (DS1: Tx-Rx)	1.9	Shielded	-
12	Port 2 Coaxial BNC (E1, E3, E4, DS3, STM-1-e, STS-3e: Tx-Rx)	2.1	Shielded	-
13	RJ48 (Port 1 E1 Balanced Tx/Rx)	2.0	Unshielded	-
14	RJ48 (Port 2 E1 Balanced Tx/Rx)	2.0	Unshielded	-
15	Ethernet (Port 1/2 Tx/Rx RJ45 Ethernet electrical)	3.0	Unshielded	Cat.5e
16	Optical Fiber (Port 1/2 Tx/Rx SFP/SFP+) (SDH/SONET/OTN/Ethernet optical)	2.0	Unshielded	-
17	Coaxial BNC (Unit Sync input)	2.0	Shielded	-
18	Coaxial BNC (Unit Sync output)	2.0	Shielded	-

SECTION 5: Conducted emission

5.1 Operating environment

Test place : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of peripheral was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN.
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.
Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN).
An overview sweep with peak detection has been performed.
The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector.
The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ CISPR Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Carrier frequency separation

Test procedure
The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 8: Number of hopping frequency

Test procedure
The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 9: Dwell time

Test procedure
The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 10: Maximum peak output power

Test procedure
The Maximum Output Power was measured with a power meter connected to the antenna port.

Detection type: Peak / Average *1)

Summary of the test results: Pass
Refer to APPENDIX 1

*1) Average detector was used only for Reference data.

SECTION 11: Spurious emissions (Antenna port conducted)

Test procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
The radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 12: Radiated emission

12.1 Operating environment

Test room : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

12.2 Test configuration

EUT was placed on a platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Photographs of the set up are shown in APPENDIX 3.

12.3 Test conditions

Frequency range : 30MHz - 25GHz
EUT position : Table top

12.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detection.

Frequency		30 - 1000MHz	1 - 25GHz		20dBc
Detection Type	:	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	:	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz, VBW: 300kHz

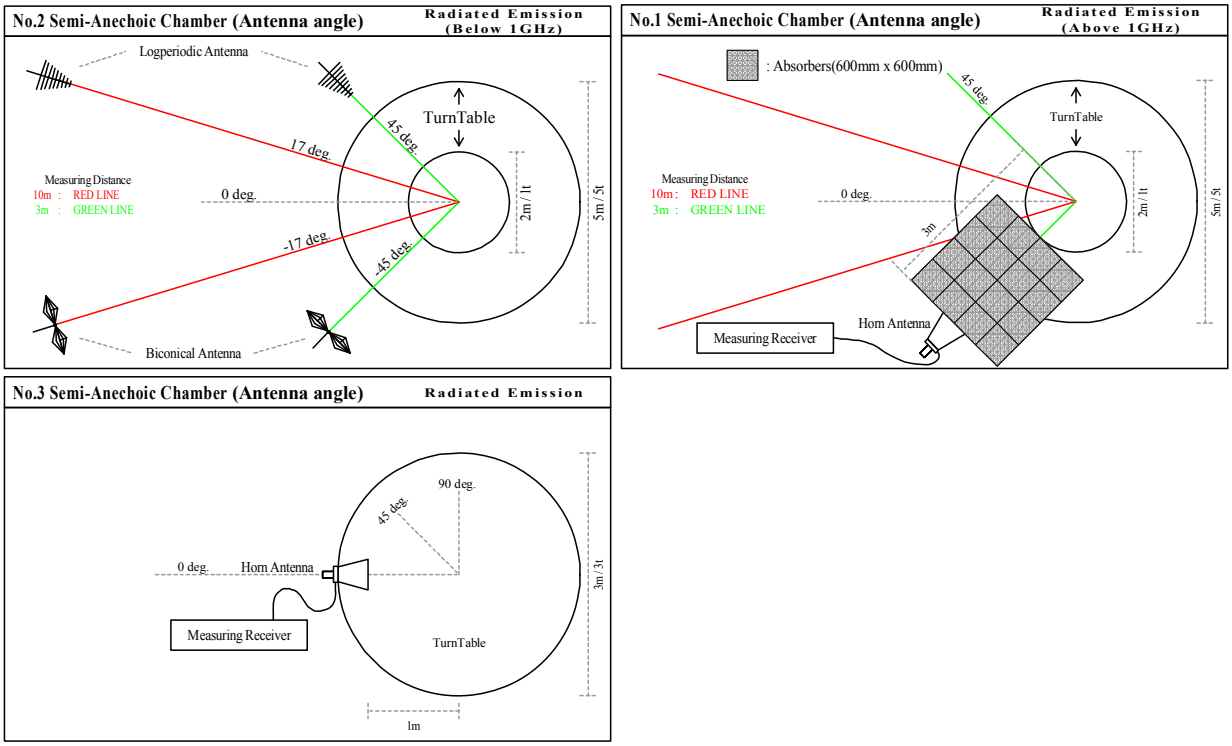
*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold. Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

The carrier levels and noise levels were confirmed at each position of a, b, c and d to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-15GHz)	Spurious (15-18GHz)	Spurious (18-25GHz)
Horizontal	c	c	c	c	c
Vertical	c	c	c	c	c

* The definition of each position is shown in a 'Pre-check of the worst position' in APPENDIX 3.

Figure 1. Antenna angle



12.5 Band edge

Band edge level at 2390MHz and 2483.5MHzis below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

12.6 Results

Summary of the test results: Pass
*No noise was detected above the 4th order harmonics.

Refer to APPENDIX 1.

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
20dB bandwidth and Carrier frequency separation
Number of hopping frequency
Dwell time
Maximum peak output power
Radiated emission
Spurious emission (Antenna port conducted)
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission
Pre-check of the worst position

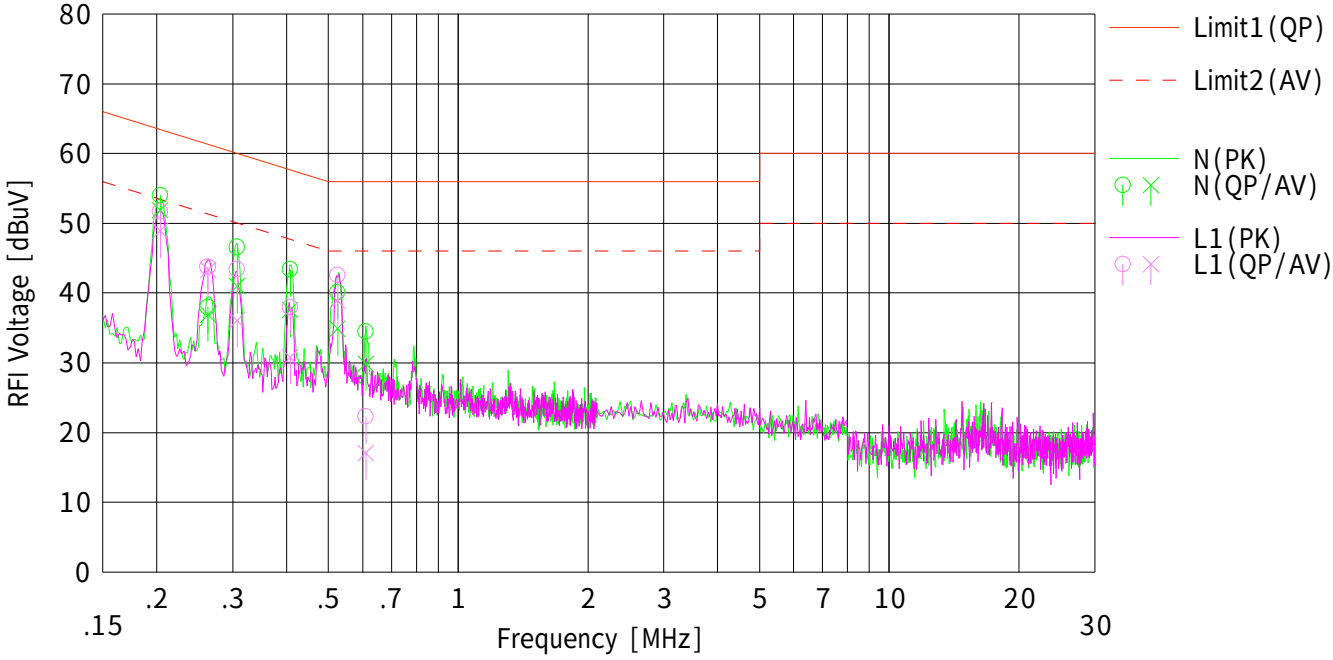
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2014/08/29

Company	: Anritsu Corporation	Mode	: Tx DH5 2402MHz
Kind of EUT	: Network Master Flex	Order No.	: 10402743S
Model No.	: MT1100A	Power	: AC120V / 60Hz
Serial No.	: Proto-17	Temp./Humi.	: 24deg.C /59%RH
Remarks	: -		

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Takahiro Suzuki



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	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.20395	41.5	39.4	12.5	54.0	51.9	63.4	53.4	9.4	1.5	N	
2	0.26289	25.4	24.3	12.6	38.0	36.9	61.3	51.3	23.3	14.4	N	
3	0.30708	34.1	28.5	12.5	46.6	41.0	60.0	50.0	13.4	9.0	N	
4	0.40848	30.9	25.1	12.5	43.4	37.6	57.6	47.6	14.2	10.0	N	
5	0.52547	27.6	22.4	12.5	40.1	34.9	56.0	46.0	15.9	11.1	N	
6	0.61083	22.0	17.4	12.5	34.5	29.9	56.0	46.0	21.5	16.1	N	
7	0.20395	39.2	36.4	12.5	51.7	48.9	63.4	53.4	11.7	4.5	L1	
8	0.26289	31.2	30.7	12.6	43.8	43.3	61.3	51.3	17.5	8.0	L1	
9	0.30708	30.9	23.6	12.5	43.4	36.1	60.0	50.0	16.6	13.9	L1	
10	0.40848	25.5	18.3	12.5	38.0	30.8	57.6	47.6	19.6	16.8	L1	
11	0.52547	30.1	26.4	12.5	42.6	38.9	56.0	46.0	13.4	7.1	L1	
12	0.61083	9.8	4.6	12.5	22.3	17.1	56.0	46.0	33.7	28.9	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-01

DATA OF CONDUCTED EMISSION TEST

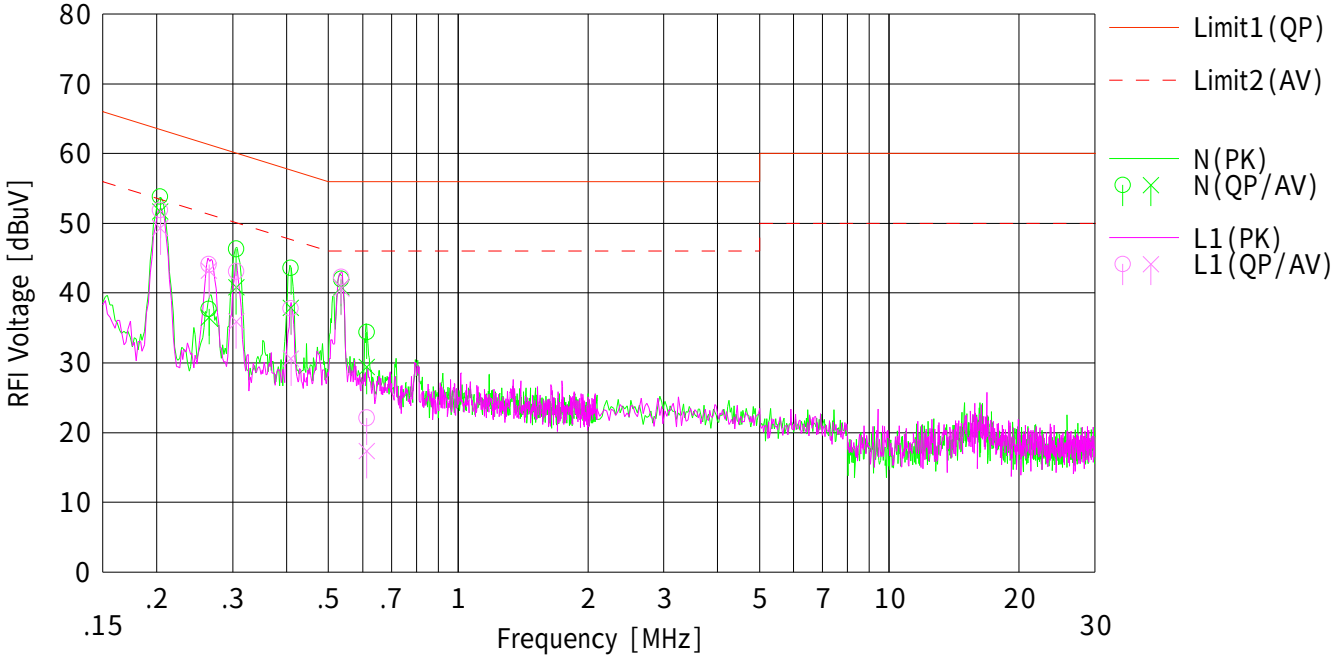
UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2014/08/29

Company : Anritsu Corporation
Kind of EUT : Network Master Flex
Model No. : MT1100A
Serial No. : Proto-17
Remarks : -

Mode : Tx DH5 2441MHz
Order No. : 10402743S
Power : AC120V / 60Hz
Temp./Humi. : 24deg.C /59%RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.20389	41.3	39.2	12.5	53.8	51.7	63.4	53.4	9.6	1.7	N	
2	0.26432	25.1	23.9	12.6	37.7	36.5	61.2	51.2	23.5	14.7	N	
3	0.30581	33.8	28.3	12.5	46.3	40.8	60.0	50.0	13.7	9.2	N	
4	0.40934	31.1	25.4	12.5	43.6	37.9	57.6	47.6	14.0	9.7	N	
5	0.53543	29.5	28.3	12.5	42.0	40.8	56.0	46.0	14.0	5.2	N	
6	0.61359	21.9	16.9	12.5	34.4	29.4	56.0	46.0	21.6	16.6	N	
7	0.20389	39.4	36.8	12.5	51.9	49.3	63.4	53.4	11.5	4.1	L1	
8	0.26432	31.5	30.6	12.6	44.1	43.2	61.2	51.2	17.1	8.0	L1	
9	0.30581	30.6	23.4	12.5	43.1	35.9	60.0	50.0	16.9	14.1	L1	
10	0.40934	25.3	18.1	12.5	37.8	30.6	57.6	47.6	19.8	17.0	L1	
11	0.53543	29.8	28.2	12.5	42.3	40.7	56.0	46.0	13.7	5.3	L1	
12	0.61359	9.6	4.8	12.5	22.1	17.3	56.0	46.0	33.9	28.7	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-01

DATA OF CONDUCTED EMISSION TEST

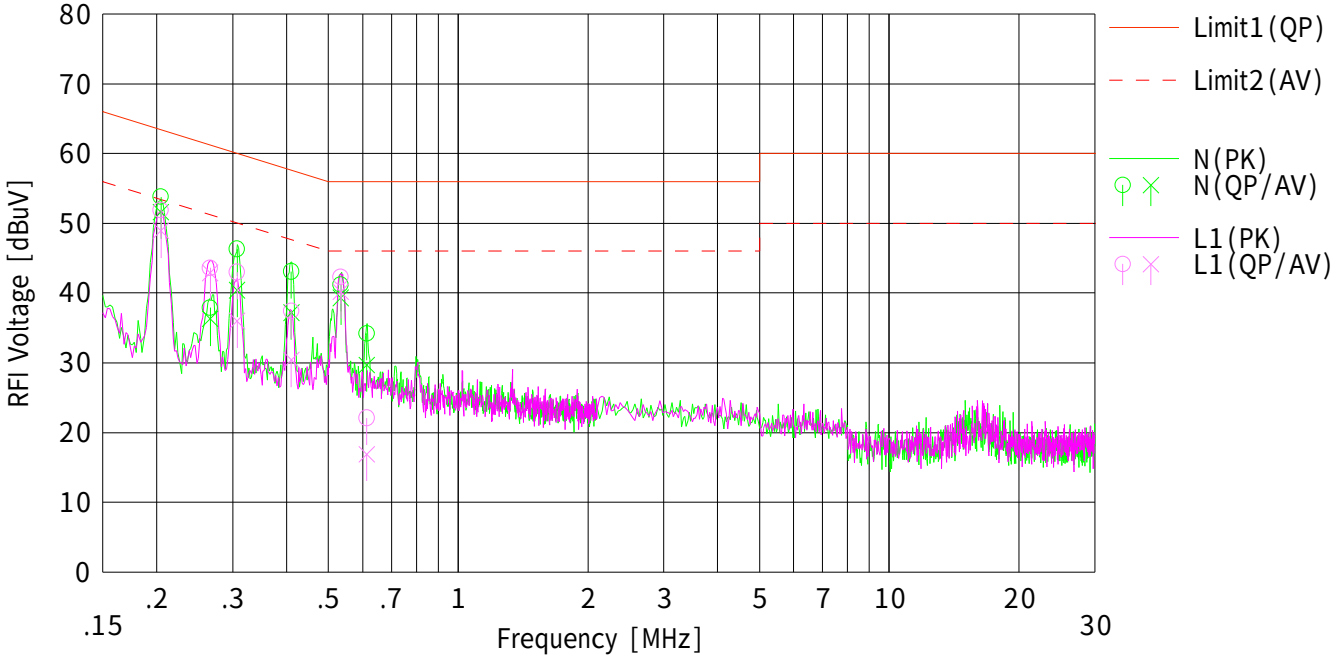
UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2014/08/29

Company : Anritsu Corporation
Kind of EUT : Network Master Flex
Model No. : MT1100A
Serial No. : Proto-17
Remarks : -

Mode : Tx DH5 2480MHz
Order No. : 10402743S
Power : AC120V / 60Hz
Temp./Humi. : 24deg.C /59%RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.20448	41.2	39.0	12.6	53.8	51.6	63.4	53.4	9.6	1.8	N	
2	0.26626	25.3	23.7	12.6	37.9	36.3	61.2	51.2	23.3	14.9	N	
3	0.30731	33.8	27.9	12.5	46.3	40.4	60.0	50.0	13.7	9.6	N	
4	0.41013	30.6	24.7	12.5	43.1	37.2	57.6	47.6	14.5	10.4	N	
5	0.53454	28.7	26.8	12.5	41.2	39.3	56.0	46.0	14.8	6.7	N	
6	0.61452	21.7	17.2	12.5	34.2	29.7	56.0	46.0	21.8	16.3	N	
7	0.20448	39.3	36.3	12.6	51.9	48.9	63.4	53.4	11.5	4.5	L1	
8	0.26626	31.0	30.3	12.6	43.6	42.9	61.2	51.2	17.6	8.3	L1	
9	0.30731	30.5	23.5	12.5	43.0	36.0	60.0	50.0	17.0	14.0	L1	
10	0.41013	24.9	17.9	12.5	37.4	30.4	57.6	47.6	20.2	17.2	L1	
11	0.53454	29.8	27.7	12.5	42.3	40.2	56.0	46.0	13.7	5.8	L1	
12	0.61452	9.6	4.4	12.5	22.1	16.9	56.0	46.0	33.9	29.1	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-01

DATA OF CONDUCTED EMISSION TEST

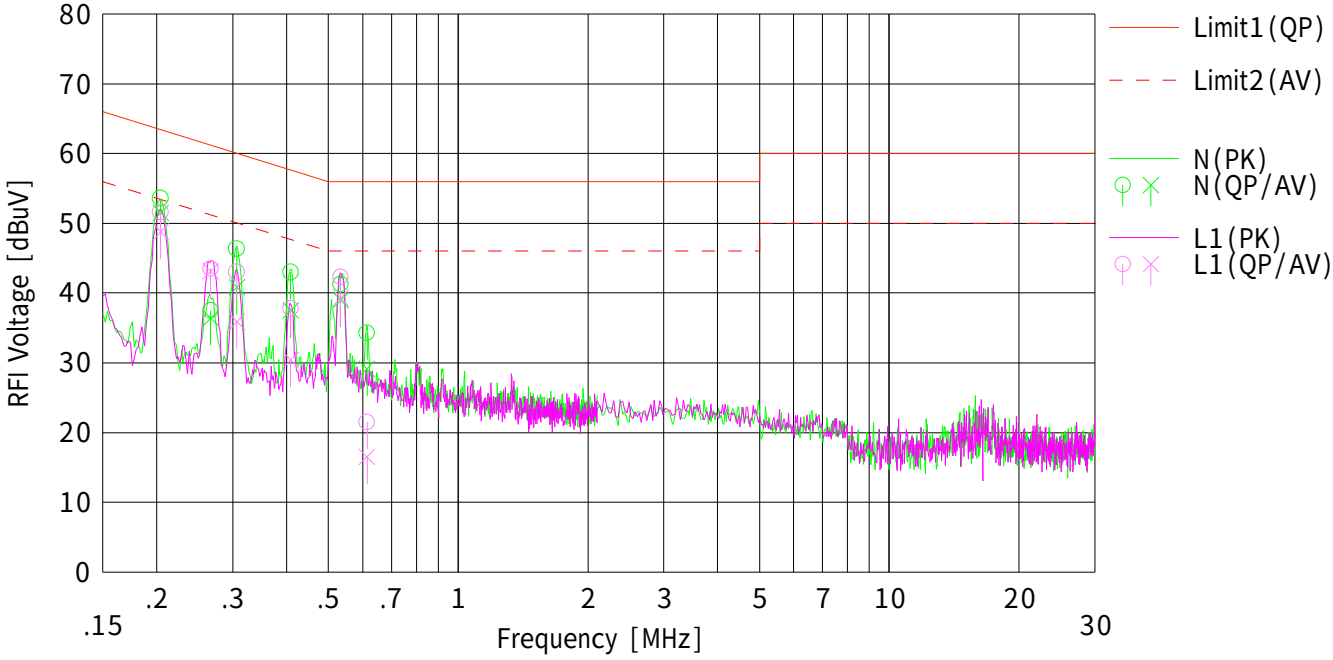
UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2014/08/29

Company : Anritsu Corporation
Kind of EUT : Network Master Flex
Model No. : MT1100A
Serial No. : Proto-17
Remarks : -

Mode : Tx 3-DH5 2402MHz
Order No. : 10402743S
Power : AC120V / 60Hz
Temp./Humi. : 24deg.C /59%RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.20407	41.0	38.9	12.6	53.6	51.5	63.4	53.4	9.8	1.9	N	
2	0.26687	24.9	23.8	12.6	37.5	36.4	61.2	51.2	23.7	14.8	N	
3	0.30649	33.9	28.3	12.5	46.4	40.8	60.0	50.0	13.6	9.2	N	
4	0.40890	30.5	25.0	12.5	43.0	37.5	57.6	47.6	14.6	10.1	N	
5	0.53408	28.8	26.5	12.5	41.3	39.0	56.0	46.0	14.7	7.0	N	
6	0.61500	21.8	16.6	12.5	34.3	29.1	56.0	46.0	21.7	16.9	N	
7	0.20407	39.0	36.2	12.6	51.6	48.8	63.4	53.4	11.8	4.6	L1	
8	0.26687	30.9	30.5	12.6	43.5	43.1	61.2	51.2	17.7	8.1	L1	
9	0.30649	30.5	23.4	12.5	43.0	35.9	60.0	50.0	17.0	14.1	L1	
10	0.40890	25.3	17.9	12.5	37.8	30.4	57.6	47.6	19.8	17.2	L1	
11	0.53408	29.8	26.8	12.5	42.3	39.3	56.0	46.0	13.7	6.7	L1	
12	0.61500	9.0	4.0	12.5	21.5	16.5	56.0	46.0	34.5	29.5	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-01

DATA OF CONDUCTED EMISSION TEST

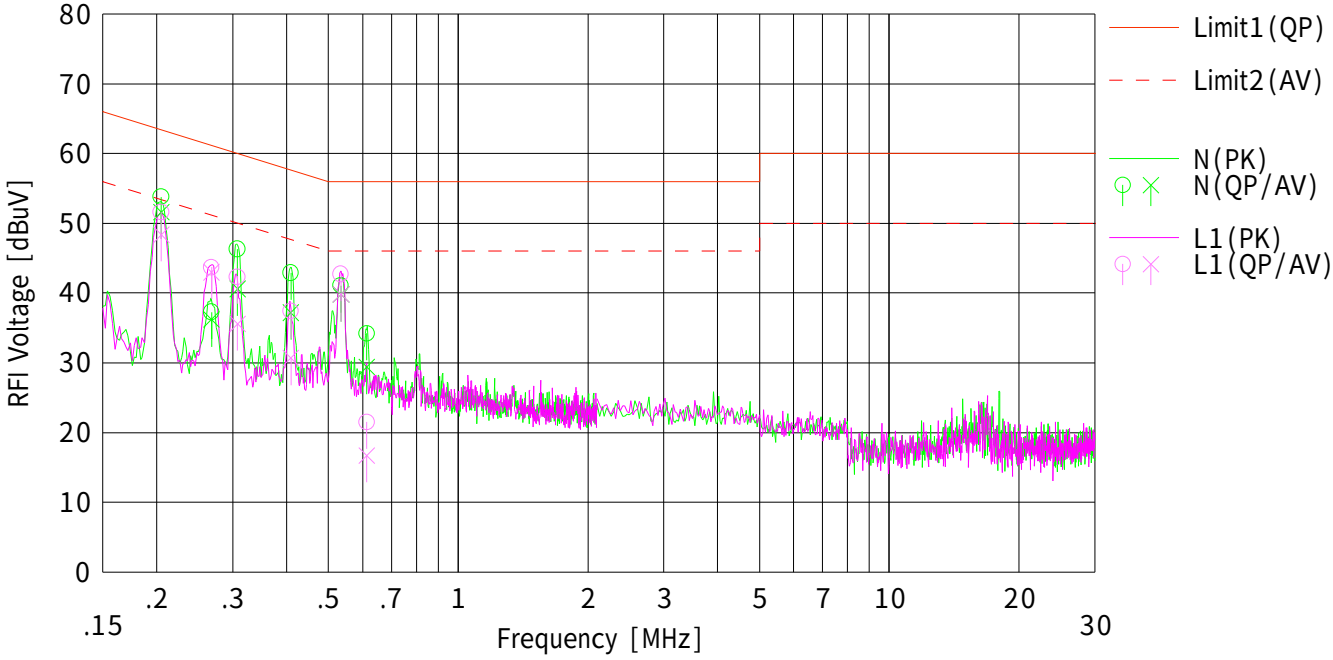
UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2014/08/29

Company : Anritsu Corporation
Kind of EUT : Network Master Flex
Model No. : MT1100A
Serial No. : Proto-17
Remarks : -

Mode : Tx 3-DH5 2441MHz
Order No. : 10402743S
Power : AC120V / 60Hz
Temp./Humi. : 24deg.C /59%RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.20474	41.2	39.0	12.6	53.8	51.6	63.4	53.4	9.6	1.8	N	
2	0.26813	24.7	23.6	12.6	37.3	36.2	61.1	51.1	23.8	14.9	N	
3	0.30758	33.8	28.1	12.5	46.3	40.6	60.0	50.0	13.7	9.4	N	
4	0.40959	30.4	24.7	12.5	42.9	37.2	57.6	47.6	14.7	10.4	N	
5	0.53510	28.6	27.3	12.5	41.1	39.8	56.0	46.0	14.9	6.2	N	
6	0.61402	21.7	16.9	12.5	34.2	29.4	56.0	46.0	21.8	16.6	N	
7	0.20474	39.0	35.8	12.6	51.6	48.4	63.4	53.4	11.8	5.0	L1	
8	0.26813	31.1	30.4	12.6	43.7	43.0	61.1	51.1	17.4	8.1	L1	
9	0.30758	29.8	23.1	12.5	42.3	35.6	60.0	50.0	17.7	14.4	L1	
10	0.40959	24.9	18.2	12.5	37.4	30.7	57.6	47.6	20.2	16.9	L1	
11	0.53510	30.2	27.3	12.5	42.7	39.8	56.0	46.0	13.3	6.2	L1	
12	0.61402	9.0	4.2	12.5	21.5	16.7	56.0	46.0	34.5	29.3	L1	

Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-01

DATA OF CONDUCTED EMISSION TEST

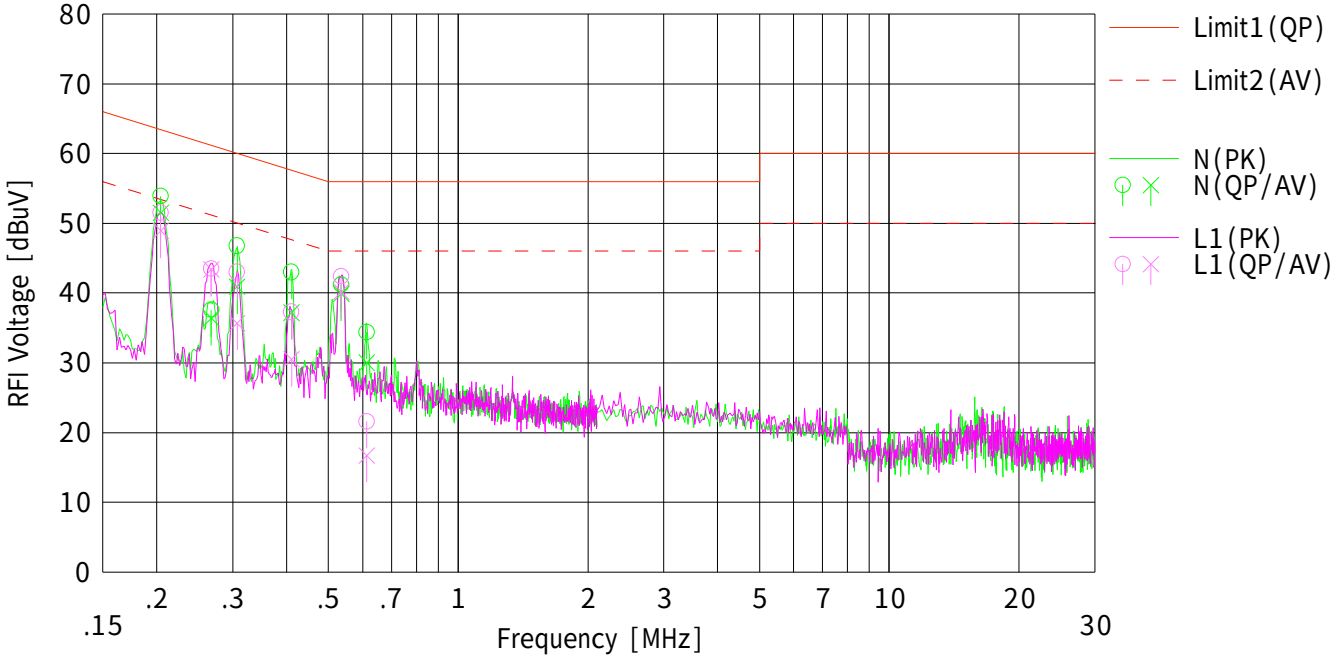
UL Japan,Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2014/08/29

Company : Anritsu Corporation
Kind of EUT : Network Master Flex
Model No. : MT1100A
Serial No. : Proto-17
Remarks : -

Mode : Tx 3-DH5 2480MHz
Order No. : 10402743S
Power : AC120V / 60Hz
Temp./Humi. : 24deg.C /59%RH

Limit1 : FCC 15C(15.207) QP
Limit2 : FCC 15C(15.207) AV

Engineer : Takahiro Suzuki



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.20415	41.3	38.9	12.6	53.9	51.5	63.4	53.4	9.5	1.9	N	
2	0.26745	25.0	23.8	12.6	37.6	36.4	61.1	51.1	23.5	14.7	N	
3	0.30696	34.3	28.4	12.5	46.8	40.9	60.0	50.0	13.2	9.1	N	
4	0.41105	30.5	24.7	12.5	43.0	37.2	57.6	47.6	14.6	10.4	N	
5	0.53595	28.7	27.4	12.5	41.2	39.9	56.0	46.0	14.8	6.1	N	
6	0.61370	21.9	17.5	12.5	34.4	30.0	56.0	46.0	21.6	16.0	N	
7	0.20415	38.9	36.3	12.6	51.5	48.9	63.4	53.4	11.9	4.5	L1	
8	0.26745	30.9	30.8	12.6	43.5	43.4	61.1	51.1	17.6	7.7	L1	
9	0.30696	30.5	23.2	12.5	43.0	35.7	60.0	50.0	17.0	14.3	L1	
10	0.41105	24.8	18.0	12.5	37.3	30.5	57.6	47.6	20.3	17.1	L1	
11	0.53595	29.9	27.7	12.5	42.4	40.2	56.0	46.0	13.6	5.8	L1	
12	0.61370	9.1	4.2	12.5	21.6	16.7	56.0	46.0	34.4	29.3	L1	

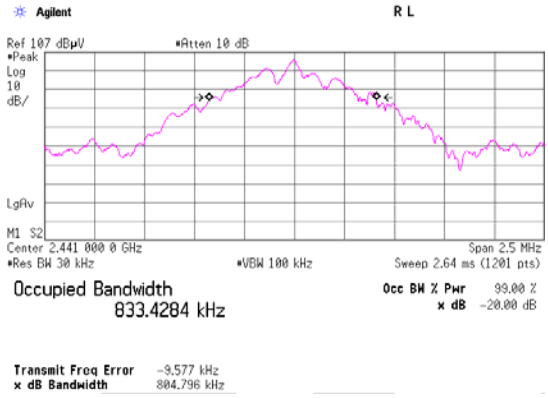
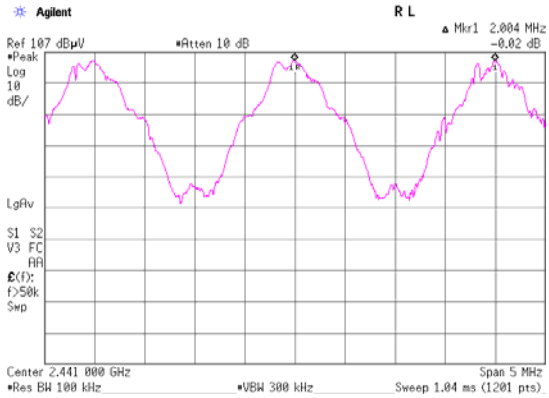
Calculation:Result[dBuV]=Reading[dBuV]+C.Fac(LISN+Cable+ATT)[dB]
LISN:SLS-01

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.988	1.005	>= 0.658
DH5	2441.0	0.965	1.000	>= 0.644
DH5	2480.0	0.995	1.003	>= 0.663
Inquiry	2441.0	0.805	2.004	>= 0.537

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

Inquiry	
20dB Bandwidth	**Carrier Frequency Separation**
Tx, 2441MHz	**Tx, 2441MHz**
Tx2_Inquiry20OBW 	Tx2_InquirySeparation 

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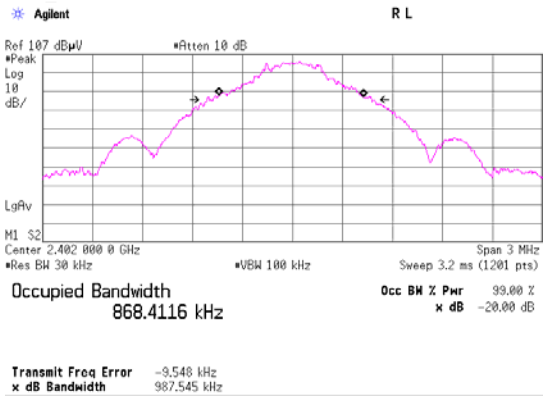
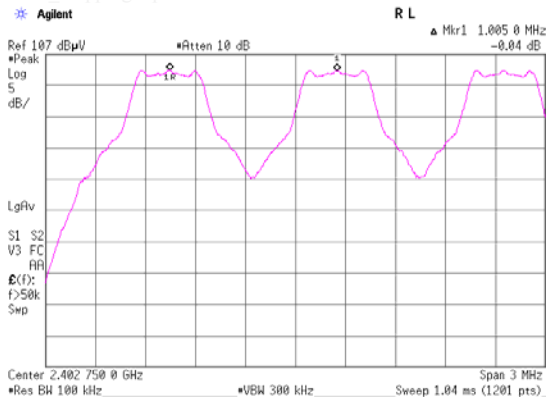
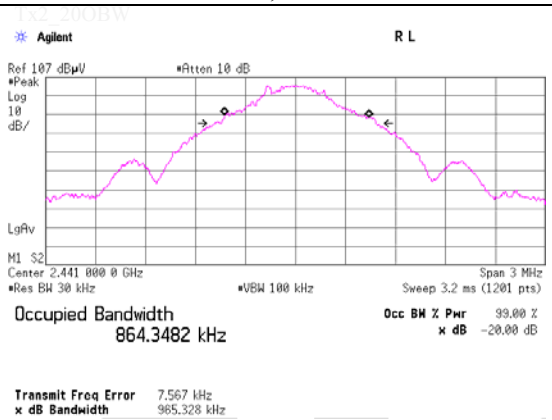
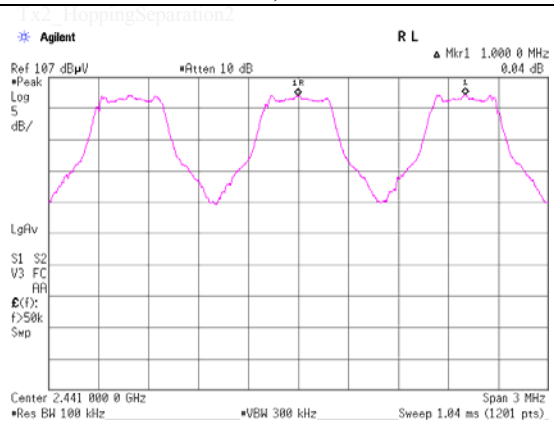
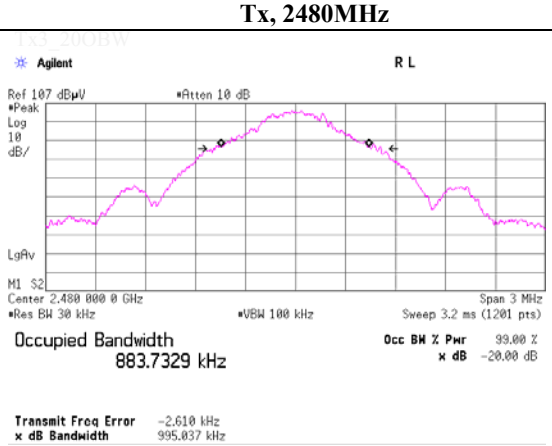
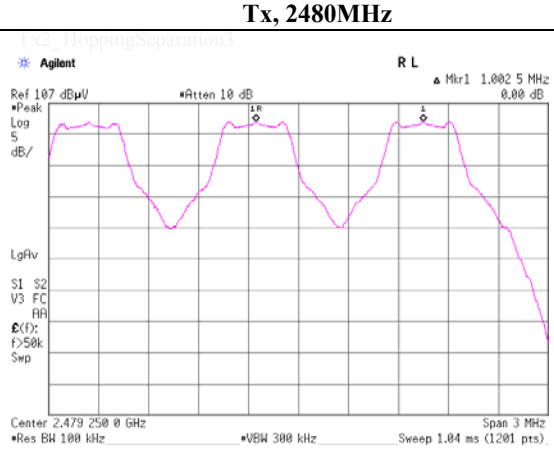
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
	
Tx, 2441MHz	**Tx, 2441MHz**
	
Tx, 2480MHz	**Tx, 2480MHz**
	

UL Japan, Inc.
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20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 15, 2014	
Temperature / Humidity	26 deg.C , 62 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.342	1.003	>= 0.895
3-DH5	2441.0	1.345	1.003	>= 0.896
3-DH5	2480.0	1.332	1.000	>= 0.888

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

UL Japan, Inc.
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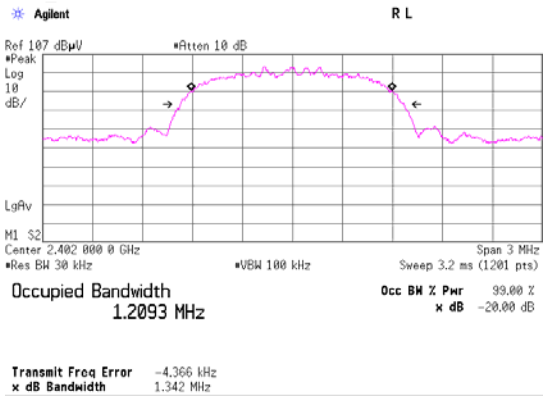
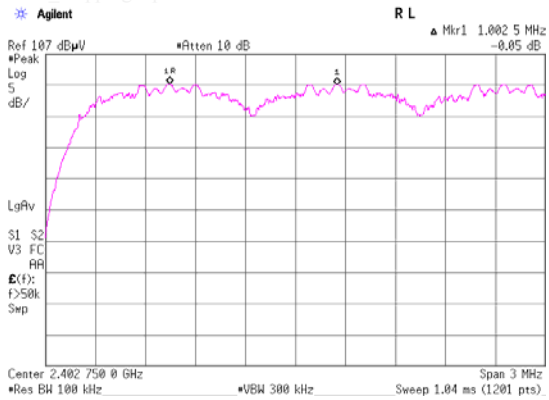
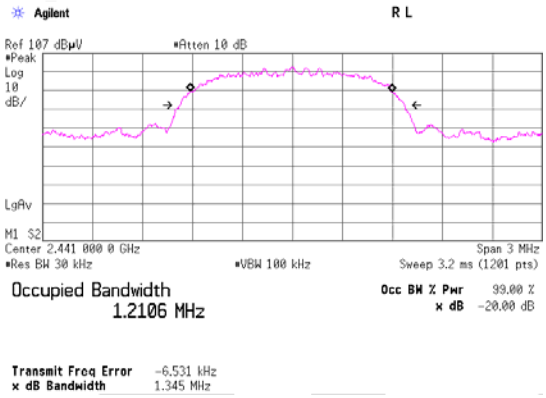
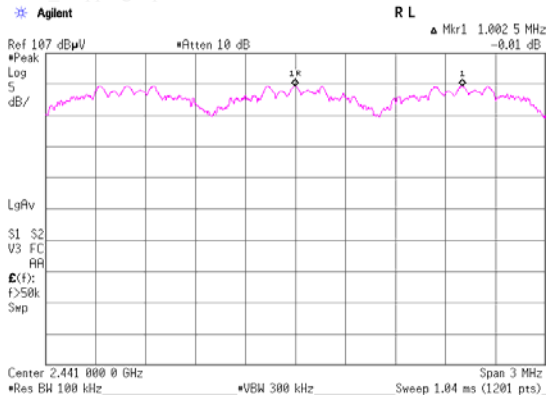
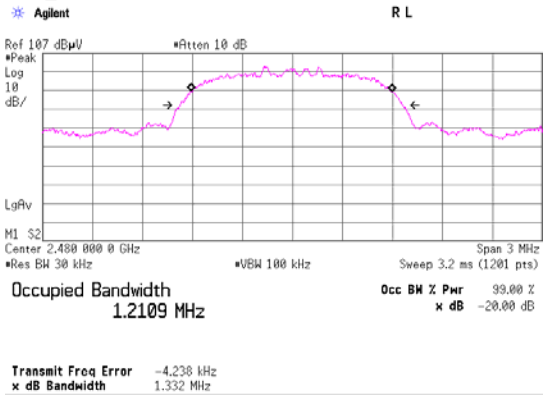
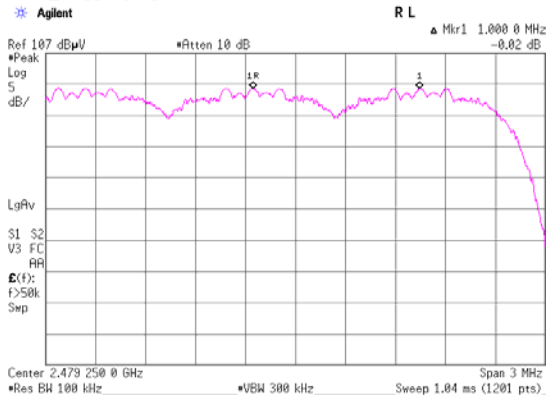
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
	
Tx, 2441MHz	**Tx, 2441MHz**
	
Tx, 2480MHz	**Tx, 2480MHz**
	

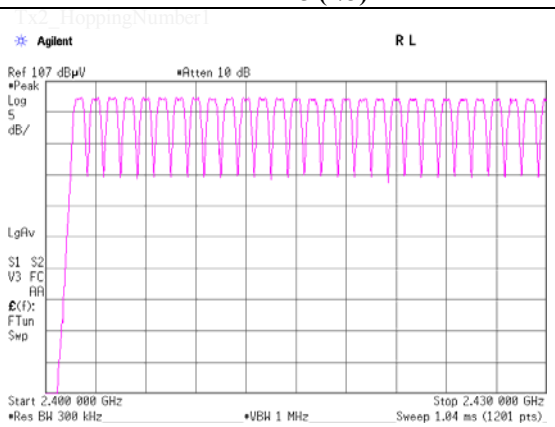
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, BDR, PRBS9	

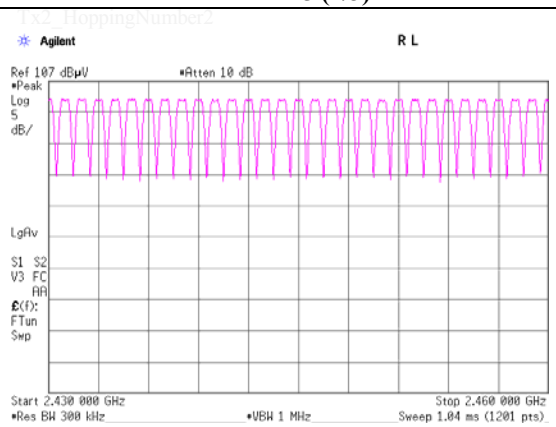
Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15

* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

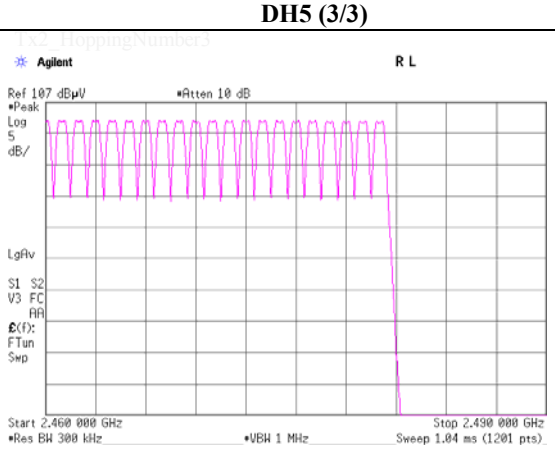
DH5 (1/3)



DH5 (2/3)



DH5 (3/3)



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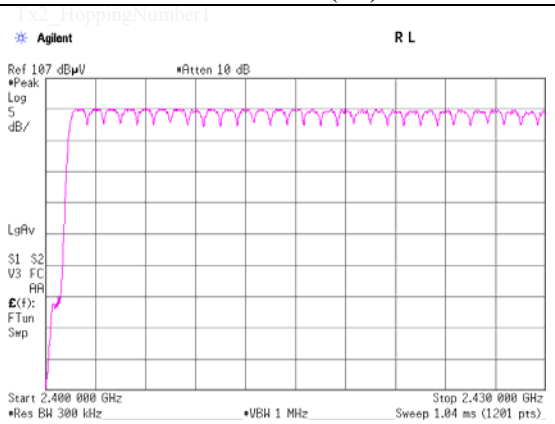
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 15, 2014	
Temperature / Humidity	26 deg.C , 62 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, EDR, PRBS9	

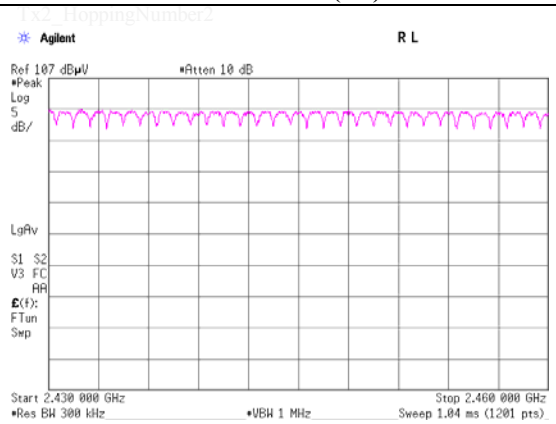
Mode	Number of Channel [times]	Limit [times]
3-DH5	79	>= 15

* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

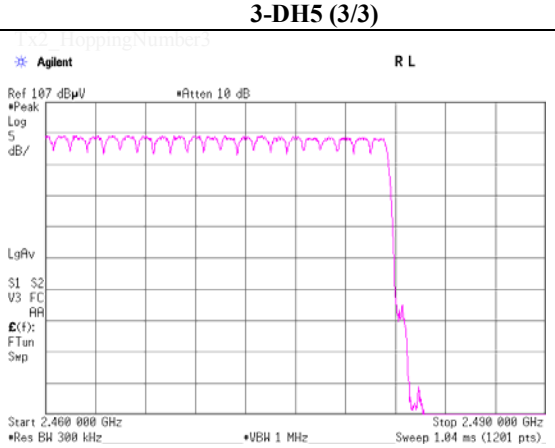
3-DH5 (1/3)



3-DH5 (2/3)



3-DH5 (3/3)



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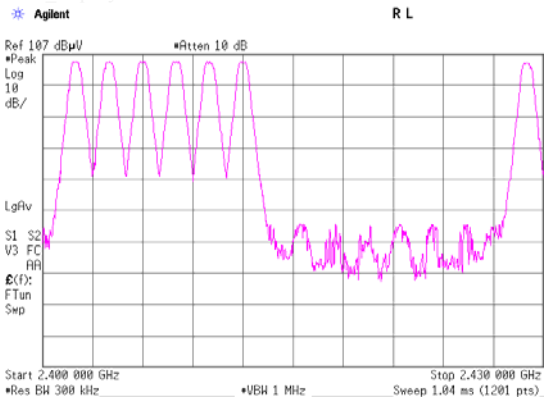
Number of Hopping Frequency

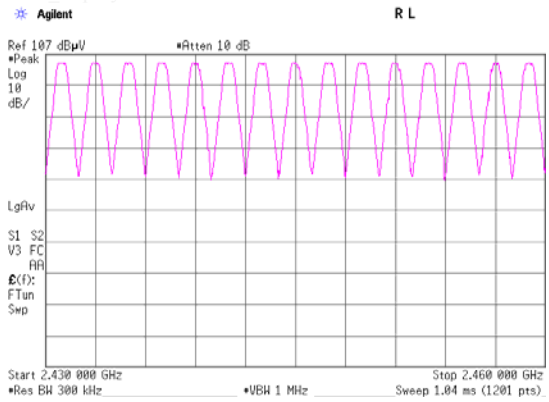
Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, Inquiry	

Mode	Number of Channel [times]	Limit [times]
Inquiry	32	>= 15

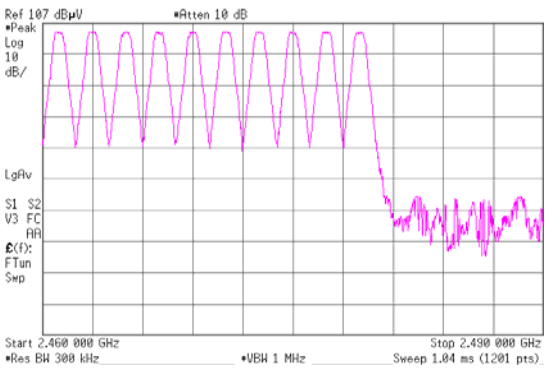
Inquiry (1/3)



Inquiry (2/3)



Inquiry (3/3)



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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	49.4 / 5.0 sec. x 31.6 sec. = 313 times	0.424	133	400
DH3	24.6 / 5.0 sec. x 31.6 sec. = 156 times	1.679	262	400
DH5	17.4 / 5.0 sec. x 31.6 sec. = 110 times	2.931	322	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.135	173	400

Sample Calculation

Result = Number of transmission x Length of transmition time

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	51	48	48	49	49.4
DH3	22	24	24	24	29	24.6
DH5	14	13	18	19	23	17.4
Inquiry	100	100	100	100	100	100.0

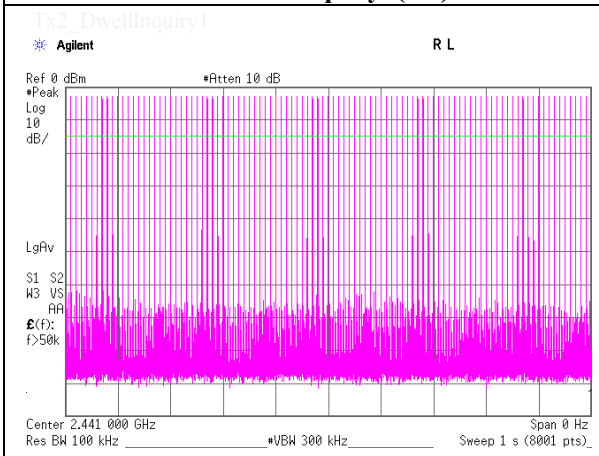
Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

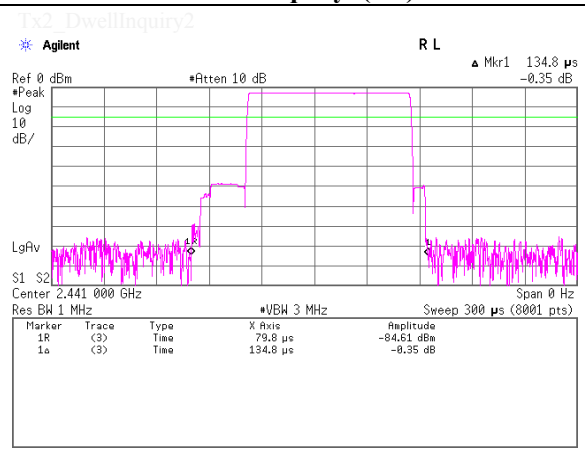
* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence (20 ≤ N ≤ 79), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for N=79.

Inquiry

Inquiry (1/2)



Inquiry (2/2)



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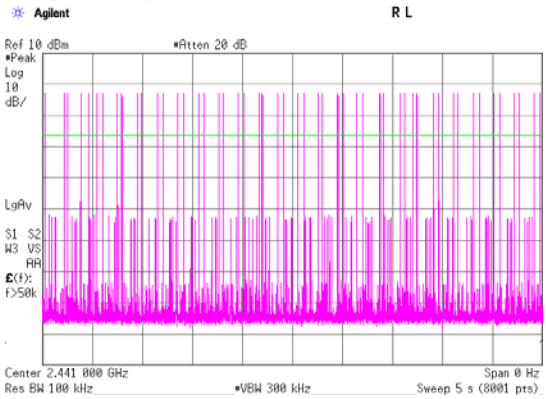
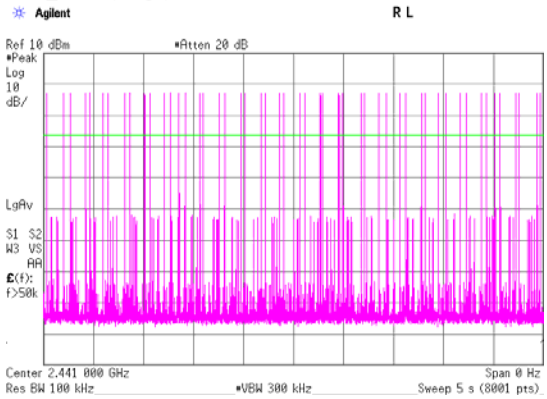
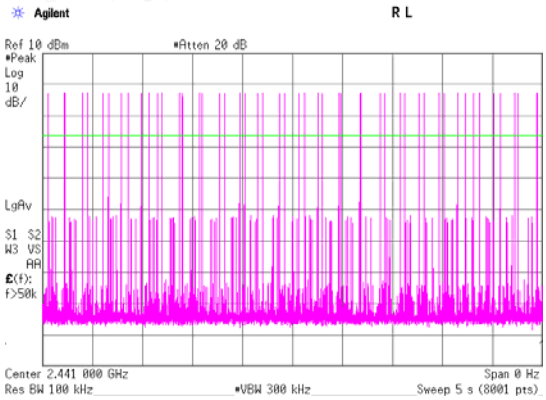
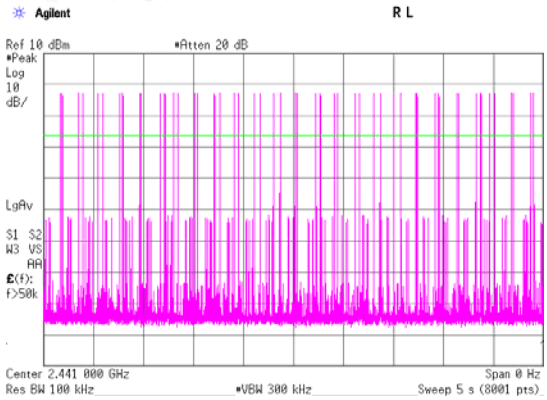
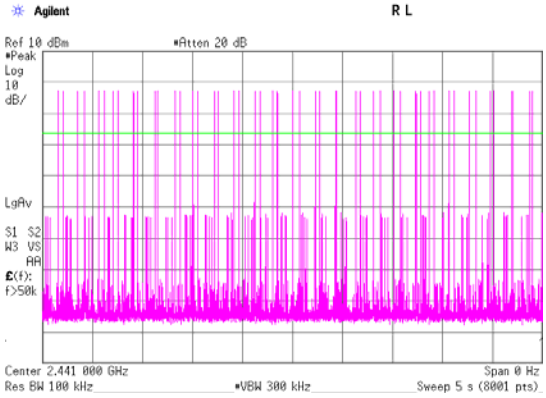
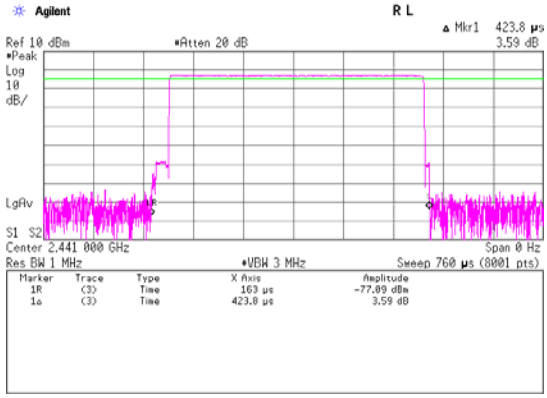
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH1 - in 5sec.(1/5)	DH1 - in 5sec.(2/5)
	
DH1 - in 5sec.(3/5)	**DH1 - in 5sec.(4/5)**
	
DH1 - in 5sec.(5/5)	**DH1 - 1pulse**
	

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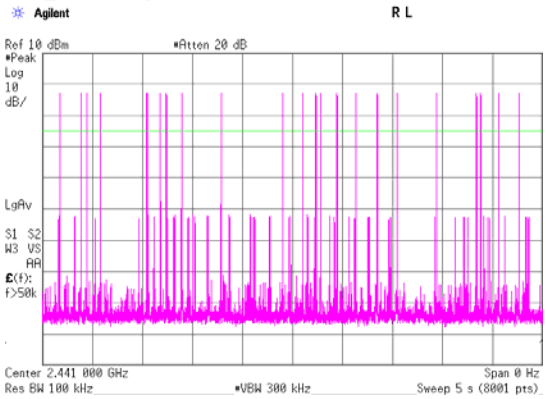
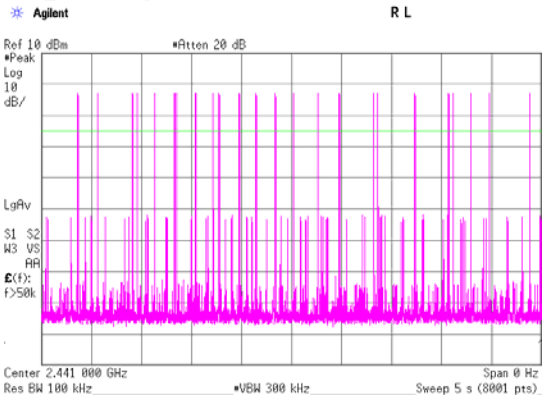
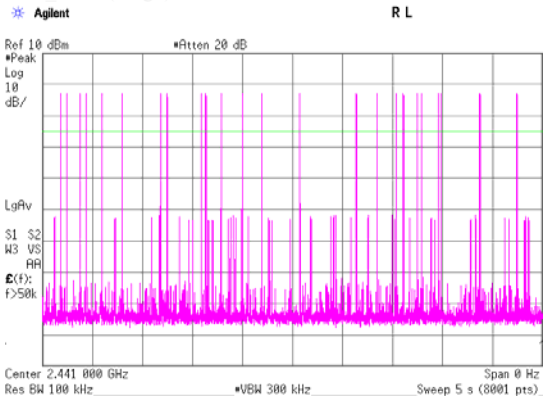
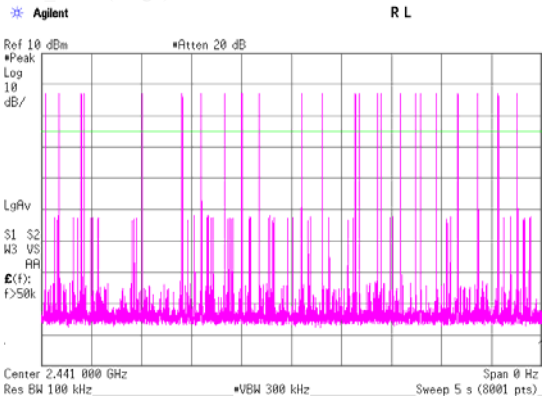
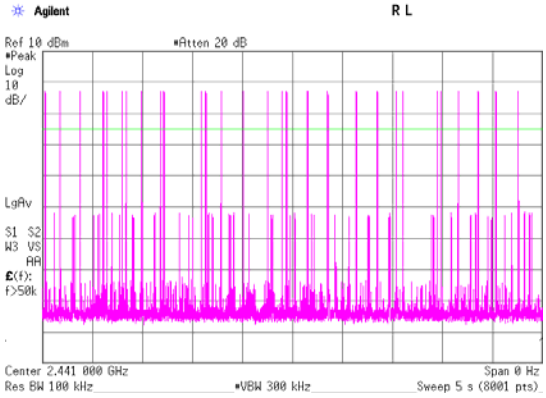
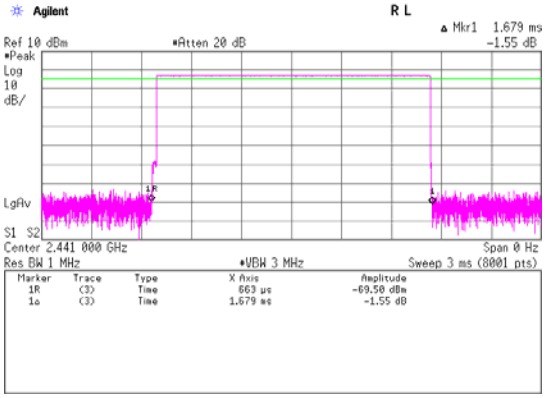
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH3 - in 5sec.(1/5)	DH3 - in 5sec.(2/5)
	
DH3 - in 5sec.(3/5)	**DH3 - in 5sec.(4/5)**
	
DH3 - in 5sec.(5/5)	**DH3 - 1pulse**
	

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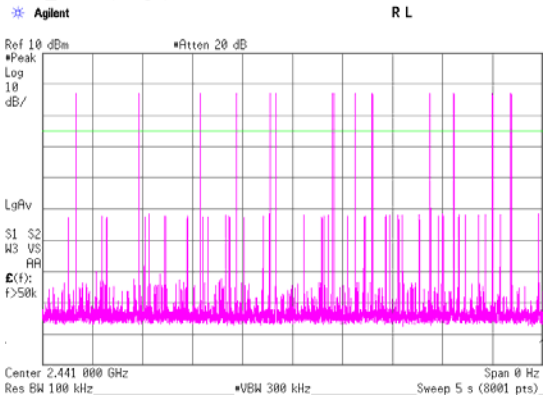
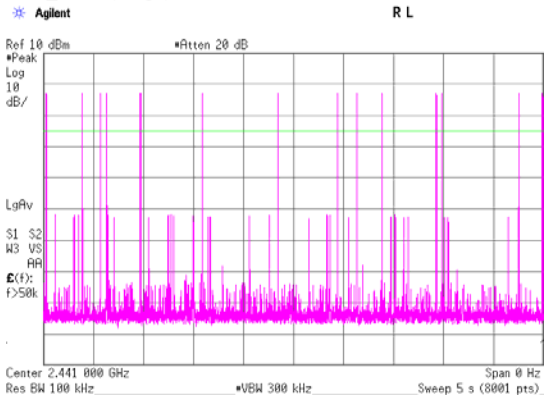
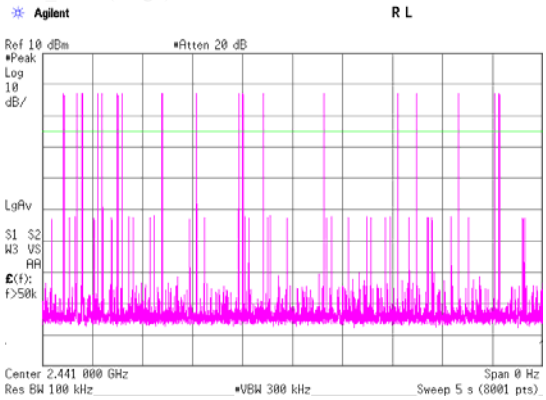
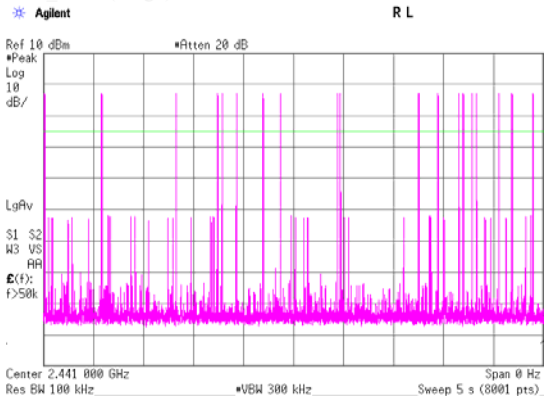
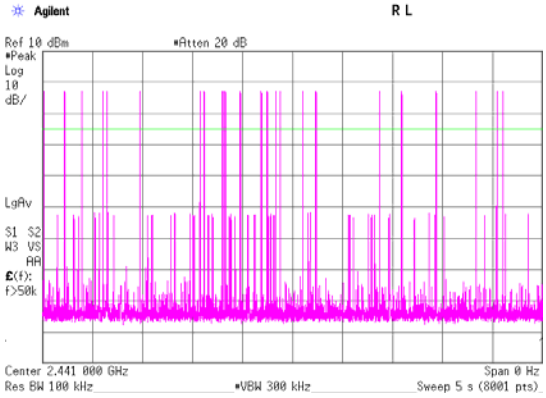
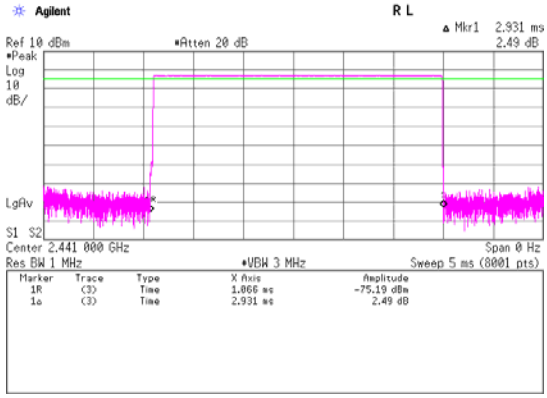
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH5 - in 5sec.(1/5)	DH5 - in 5sec.(2/5)
	
DH5 - in 5sec.(3/5)	**DH5 - in 5sec.(4/5)**
	
DH5 - in 5sec.(5/5)	**DH5 - 1pulse**
	

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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 15, 2014	
Temperature / Humidity	26 deg.C , 62 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second	Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	49.6 / 5.0 sec. x 31.6 sec. = 314 times	0.434	136	400
3-DH3	24.8 / 5.0 sec. x 31.6 sec. = 157 times	1.687	265	400
3-DH5	18.0 / 5.0 sec. x 31.6 sec. = 114 times	2.937	335	400

Sample Calculation

Result = Number of transmission x Length of transmition time

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
3-DH1	49	51	50	49	49	49.6
3-DH3	20	28	25	25	26	24.8
3-DH5	15	18	19	20	18	18.0

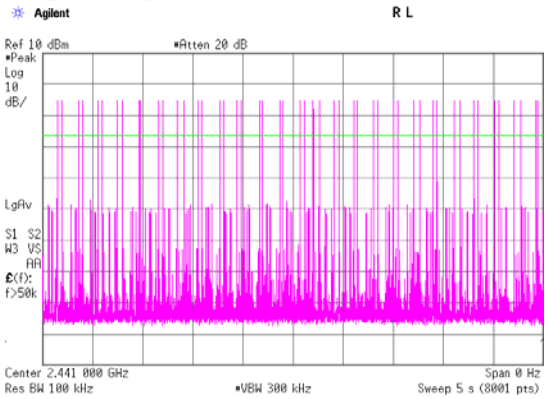
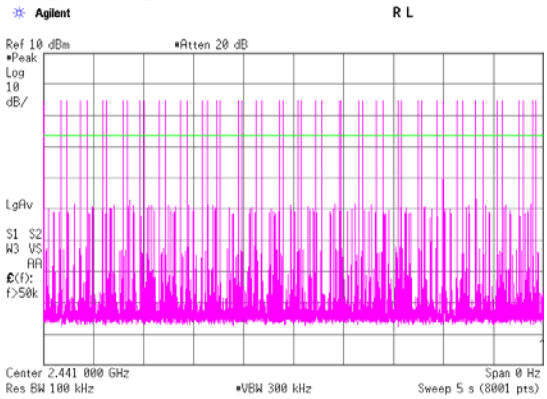
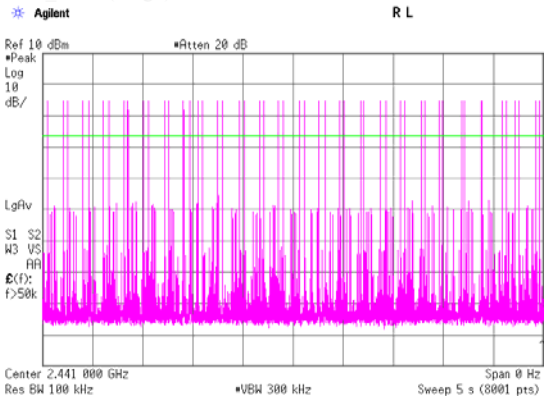
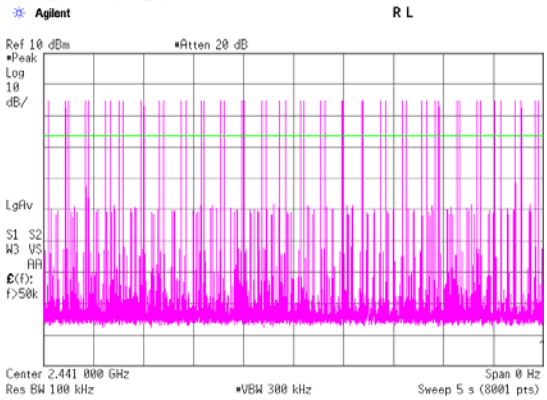
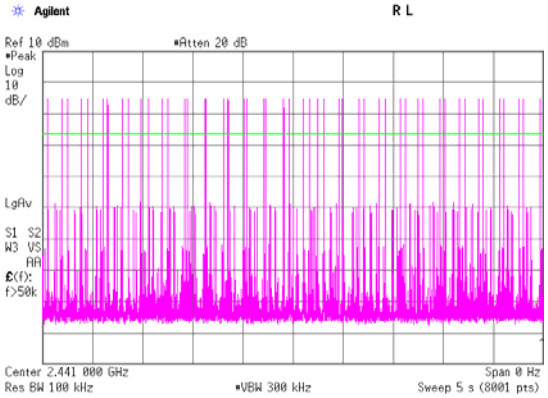
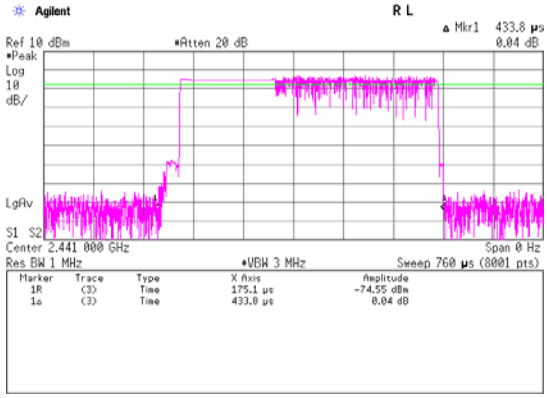
Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for N=79.

Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH1 - in 5sec.(1/5)	3-DH1 - in 5sec.(2/5)
	
3-DH1 - in 5sec.(3/5)	**3-DH1 - in 5sec.(4/5)**
	
3-DH1 - in 5sec.(5/5)	**3-DH1 - 1pulse**
	

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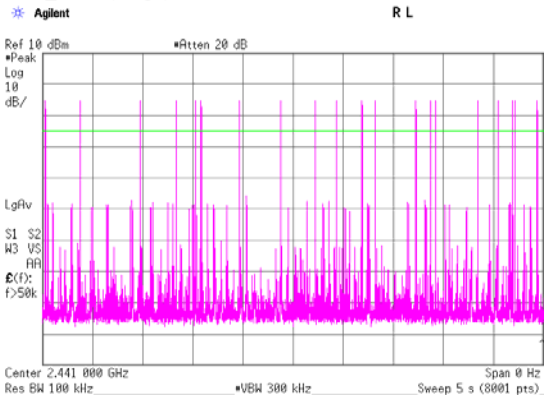
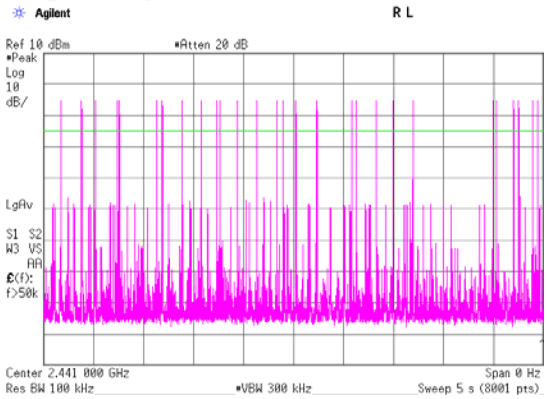
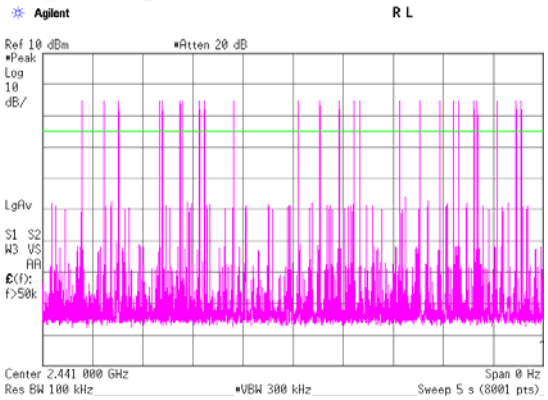
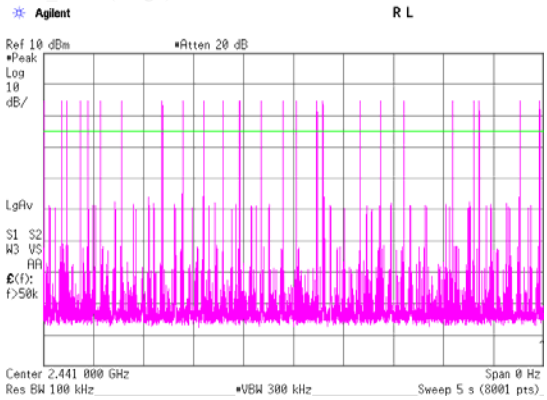
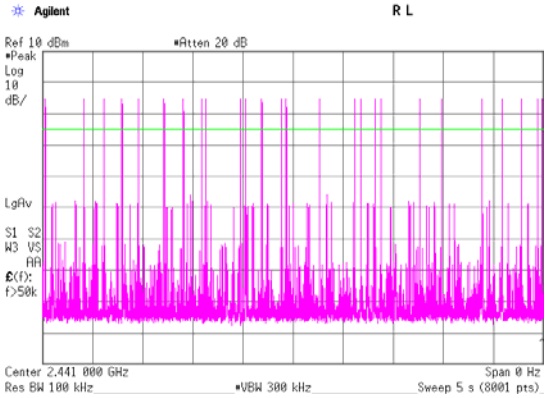
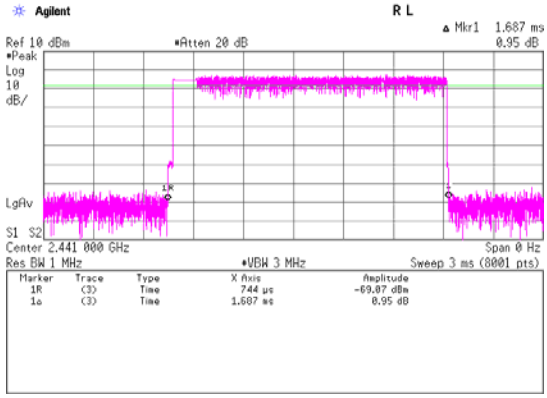
Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH3 - in 5sec.(1/5)	3-DH3 - in 5sec.(2/5)
	
3-DH3 - in 5sec.(3/5)	**3-DH3 - in 5sec.(4/5)**
	
3-DH3 - in 5sec.(5/5)	**3-DH3 - 1pulse**
	

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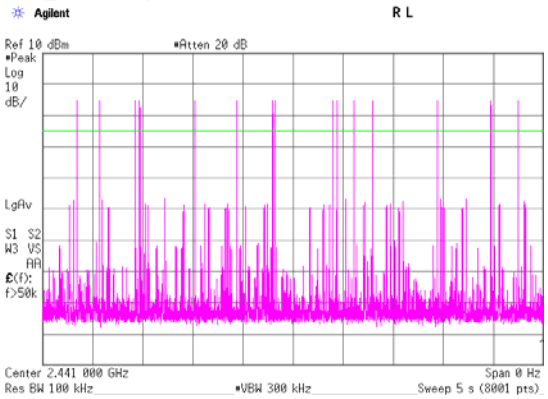
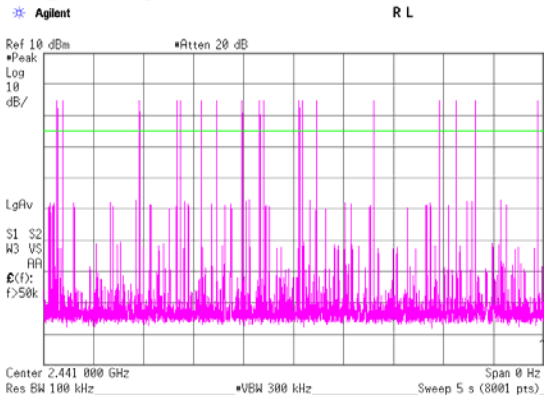
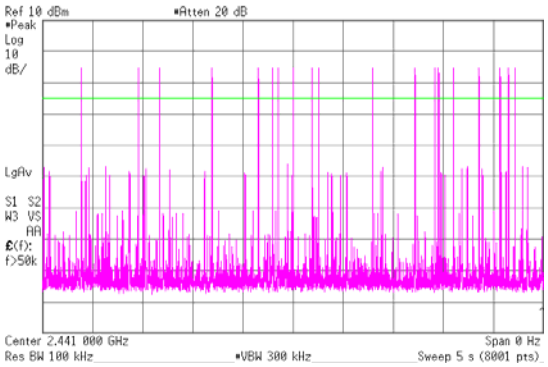
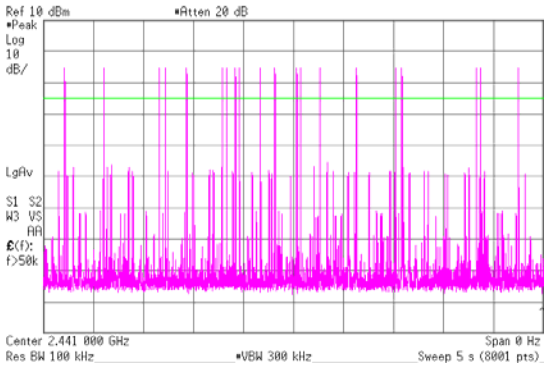
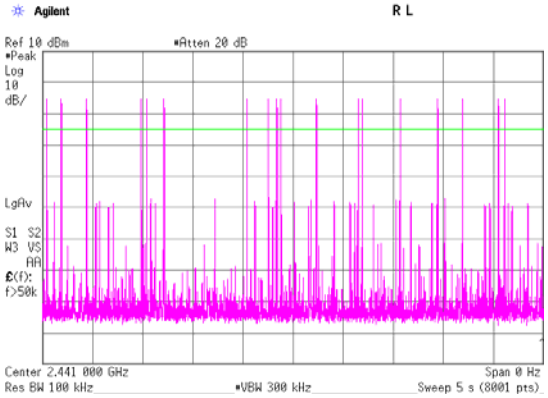
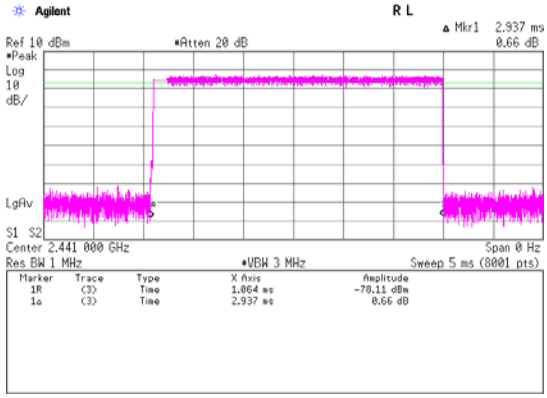
Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH5 - in 5sec.(1/5)	3-DH5 - in 5sec.(2/5)
	
3-DH5 - in 5sec.(3/5)	**3-DH5 - in 5sec.(4/5)**
	
3-DH5 - in 5sec.(5/5)	**3-DH5 - 1pulse**
	

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Maximum Peak Conducted Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth	

(* P/M: Power Meter with power sensor)

	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-2.68	1.55	9.90	8.77	7.53	20.97	125	12.20
DH5	2441.0	-2.94	1.56	9.90	8.52	7.11	20.97	125	12.45
DH5	2480.0	-3.07	1.57	9.90	8.40	6.92	20.97	125	12.57
2-DH5	2402.0	-2.45	1.55	9.90	9.00	7.94	20.97	125	11.97
2-DH5	2441.0	-2.68	1.56	9.90	8.78	7.55	20.97	125	12.19
2-DH5	2480.0	-2.77	1.57	9.90	8.70	7.41	20.97	125	12.27
3-DH5	2402.0	-1.93	1.55	9.90	9.52	8.95	20.97	125	11.45
3-DH5	2441.0	-2.09	1.56	9.90	9.37	8.65	20.97	125	11.60
3-DH5	2480.0	-2.16	1.57	9.90	9.31	8.53	20.97	125	11.66

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

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Maximum Conducted Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth	

(* P/M: Power Meter with power sensor)

	Freq.	P/M (Average) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-3.90	1.55	9.90	7.55	5.69	20.97	125	13.42
DH5	2441.0	-4.16	1.56	9.90	7.30	5.37	20.97	125	13.67
DH5	2480.0	-4.29	1.57	9.90	7.18	5.22	20.97	125	13.79
2-DH5	2402.0	-6.26	1.55	9.90	5.19	3.30	20.97	125	15.78
2-DH5	2441.0	-6.66	1.56	9.90	4.80	3.02	20.97	125	16.17
2-DH5	2480.0	-6.96	1.57	9.90	4.51	2.82	20.97	125	16.46
3-DH5	2402.0	-6.26	1.55	9.90	5.19	3.30	20.97	125	15.78
3-DH5	2441.0	-6.65	1.56	9.90	4.81	3.03	20.97	125	16.16
3-DH5	2480.0	-6.96	1.57	9.90	4.51	2.82	20.97	125	16.46

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

UL Japan, Inc.
Shonan EMC Lab.

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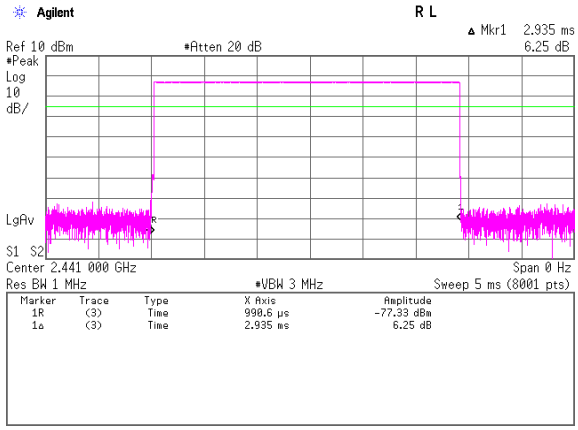
Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	

Dwell time factor Calculation chart

Dwell time factor Calculation

Tx, Bluetooth, BDR, PRBS9	
Worst 100ms **Dwell time factor =20log((2.935 x 2)/100) = -24.63dB**	**1cycle On time :** **2.935ms**
ON time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.	

VBW (Average) setting

***Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.**

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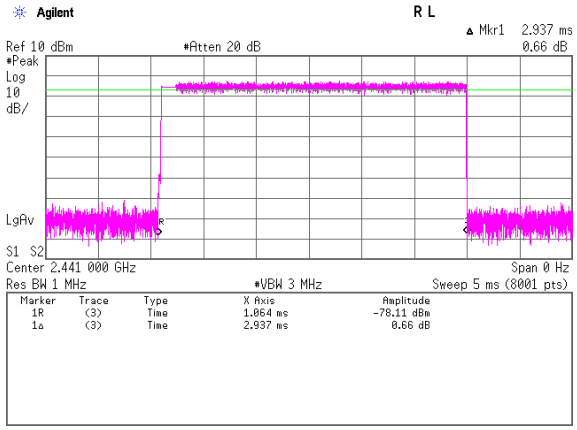
Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 15, 2014	
Temperature / Humidity	26 deg.C , 62 %RH	
Engineer	Hikaru Shirasawa	

Dwell time factor Calculation chart

Dwell time factor Calculation

Tx, Bluetooth, EDR, PRBS9	
Worst 100ms **Dwell time factor =20log((2.937 x 2)/100) = -24.62dB**	**1cycle On time :** **2.937ms**
ON time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.	

VBW (Average) setting

***Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.**

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	August 16, 2014	August 27, 2014	September 3, 2014
Temperature / Humidity	25deg.C , 67%RH	24deg.C , 55%RH	25deg.C , 56%RH
Engineer	Tomochika Sato	Takahiro Suzuki	Kenichi Adachi
Mode	Tx, 2402 MHz		
	Tx, Bluetooth, BDR (DH5), PRBS9		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	72.031	QP	46.8	6.4	7.4	31.9	28.7	40.0	11.3	273	67	
Hori.	678.819	QP	44.1	20.0	8.6	31.6	41.1	46.0	4.9	136	81	
Hori.	798.605	QP	35.8	20.9	9.1	31.4	34.4	46.0	11.6	137	197	
Hori.	1750.747	PK	47.8	24.8	13.9	41.0	45.5	73.9	28.4	137	291	
Hori.	1874.922	PK	47.9	24.9	14.0	41.0	45.8	73.9	28.1	117	358	
Hori.	2390.000	PK	44.6	25.9	14.6	40.9	44.2	73.9	29.7	100	133	
Hori.	3203.048	PK	51.9	27.6	6.4	41.4	44.5	73.9	29.4	100	116	
Hori.	4804.000	PK	54.7	30.5	7.0	41.7	50.5	73.9	23.4	133	155	
Hori.	7206.000	PK	43.8	36.2	8.4	41.5	46.9	73.9	27.0	100	0	noise floor
Hori.	9608.000	PK	40.3	38.3	9.3	40.4	47.5	73.9	26.4	100	0	noise floor
Hori.	12010.000	PK	40.4	39.4	10.3	39.7	50.4	73.9	23.5	100	0	noise floor
Hori.	1750.747	AV	42.2	24.8	13.9	41.0	39.9	53.9	14.0	137	291	
Hori.	1874.922	AV	39.3	24.9	14.0	41.0	37.2	53.9	16.7	117	358	
Hori.	2390.000	AV	33.9	25.9	14.6	40.9	33.5	53.9	20.4	100	133	
Hori.	3203.048	AV	46.1	27.6	6.4	41.4	38.7	53.9	15.2	100	116	
Hori.	4804.000	AV	47.7	30.5	7.0	41.7	43.5	53.9	10.4	133	155	
Hori.	7206.000	AV	35.6	36.2	8.4	41.5	38.7	53.9	15.2	100	0	noise floor
Hori.	9608.000	AV	33.2	38.3	9.3	40.4	40.4	53.9	13.5	100	0	noise floor
Hori.	12010.000	AV	33.5	39.4	10.3	39.7	43.5	53.9	10.4	100	0	noise floor
Vert.	624.998	QP	46.8	19.3	8.3	31.7	42.7	46.0	3.3	100	46	
Vert.	758.679	QP	40.7	20.6	8.9	31.5	38.7	46.0	7.3	100	99	
Vert.	878.472	QP	44.3	22.0	9.5	31.0	44.8	46.0	1.2	100	119	
Vert.	918.467	QP	44.2	22.4	9.6	30.8	45.4	46.0	**0.6**	100	161	
Vert.	1750.747	PK	47.5	24.8	13.9	41.0	45.2	73.9	28.7	100	321	
Vert.	1874.922	PK	49.9	24.9	14.0	41.0	47.8	73.9	26.1	100	124	
Vert.	2390.000	PK	46.3	25.9	14.6	40.9	45.9	73.9	28.0	100	57	
Vert.	3203.048	PK	52.8	27.6	6.4	41.4	45.4	73.9	28.5	183	240	
Vert.	4804.000	PK	52.7	30.5	7.0	41.7	48.5	73.9	25.4	100	260	
Vert.	7206.000	PK	46.0	36.2	8.4	41.5	49.1	73.9	24.8	100	0	noise floor
Vert.	9608.000	PK	40.2	38.3	9.3	40.4	47.4	73.9	26.5	100	0	noise floor
Vert.	12010.000	PK	39.3	39.4	10.3	39.7	49.3	73.9	24.6	100	0	noise floor
Vert.	1750.747	AV	40.2	24.8	13.9	41.0	37.9	53.9	16.0	100	321	
Vert.	1874.922	AV	45.1	24.9	14.0	41.0	43.0	53.9	10.9	100	124	
Vert.	2390.000	AV	33.8	25.9	14.6	40.9	33.4	53.9	20.5	100	57	
Vert.	3203.048	AV	46.8	27.6	6.4	41.4	39.4	53.9	14.5	183	240	
Vert.	4804.000	AV	45.9	30.5	7.0	41.7	41.7	53.9	12.2	100	260	
Vert.	7206.000	AV	35.3	36.2	8.4	41.5	38.4	53.9	15.5	100	0	noise floor
Vert.	9608.000	AV	33.0	38.3	9.3	40.4	40.2	53.9	13.7	100	0	noise floor
Vert.	12010.000	AV	33.4	39.4	10.3	39.7	43.4	53.9	10.5	100	0	noise floor

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	90.9	26.0	14.6	40.9	90.6	-	-	100k/300k
Hori.	2400.000	PK	35.4	26.0	14.6	40.9	35.1	70.6	35.5	100k/300k
Vert.	2402.000	PK	85.9	26.0	14.6	40.9	85.6	-	-	100k/300k
Vert.	2400.000	PK	35.8	26.0	14.6	40.9	35.5	65.6	30.1	100k/300k

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	August 16, 2014	August 27, 2014	September 3, 2014
Temperature / Humidity	25deg.C , 67%RH	24deg.C , 55%RH	25deg.C , 56%RH
Engineer	Tomochika Sato	Takahiro Suzuki	Kenichi Adachi
Mode	Tx, 2441 MHz		
	Tx, Bluetooth, BDR (DH5), PRBS9		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	72.042	QP	46.2	6.4	7.4	31.9	28.1	40.0	11.9	287	52	
Hori.	678.877	QP	43.7	20.0	8.6	31.6	40.7	46.0	5.3	136	258	
Hori.	798.720	QP	36.3	20.9	9.1	31.4	34.9	46.0	11.1	134	243	
Hori.	1750.686	PK	47.6	24.8	13.9	41.0	45.3	73.9	28.6	122	285	
Hori.	1874.858	PK	47.4	24.9	14.0	41.0	45.3	73.9	28.6	109	2	
Hori.	3001.495	PK	47.3	27.2	6.3	41.2	39.6	73.9	34.3	138	125	
Hori.	4882.000	PK	53.9	30.8	7.0	41.6	50.1	73.9	23.8	144	159	
Hori.	7323.000	PK	43.5	36.3	8.3	41.5	46.6	73.9	27.3	100	0	noise floor
Hori.	9764.000	PK	40.5	38.3	9.5	40.4	47.9	73.9	26.0	100	0	noise floor
Hori.	12205.000	PK	40.6	39.3	10.4	39.7	50.6	73.9	23.3	100	0	noise floor
Hori.	1750.686	AV	41.9	24.8	13.9	41.0	39.6	53.9	14.3	122	285	
Hori.	1874.858	AV	39.5	24.9	14.0	41.0	37.4	53.9	16.5	109	2	
Hori.	3001.495	AV	40.5	27.2	6.3	41.2	32.8	53.9	21.1	138	125	
Hori.	4882.000	AV	46.5	30.8	7.0	41.6	42.7	53.9	11.2	144	159	
Hori.	7323.000	AV	35.7	36.3	8.3	41.5	38.8	53.9	15.1	100	0	noise floor
Hori.	9764.000	AV	33.0	38.3	9.5	40.4	40.4	53.9	13.5	100	0	noise floor
Hori.	12205.000	AV	33.1	39.3	10.4	39.7	43.1	53.9	10.8	100	0	noise floor
Vert.	625.041	QP	45.3	19.3	8.3	31.7	41.2	46.0	4.8	100	49	
Vert.	758.802	QP	40.9	20.7	8.9	31.5	39.0	46.0	7.0	100	305	
Vert.	878.608	QP	44.8	22.0	9.5	31.0	45.3	46.0	**0.7**	100	131	
Vert.	918.448	QP	43.2	22.4	9.6	30.8	44.4	46.0	1.6	100	134	
Vert.	1750.686	PK	47.3	24.8	13.9	41.0	45.0	73.9	28.9	100	312	
Vert.	1874.858	PK	49.5	24.9	14.0	41.0	47.4	73.9	26.5	100	116	
Vert.	3001.495	PK	47.7	27.2	6.3	41.2	40.0	73.9	33.9	100	163	
Vert.	4882.000	PK	50.1	30.8	7.0	41.6	46.3	73.9	27.6	100	252	
Vert.	7323.000	PK	46.1	36.3	8.3	41.5	49.2	73.9	24.7	100	0	noise floor
Vert.	9764.000	PK	40.4	38.3	9.5	40.4	47.8	73.9	26.1	100	0	noise floor
Vert.	12201.570	PK	40.1	39.3	10.4	39.7	50.1	73.9	23.8	100	0	noise floor
Vert.	1750.686	AV	40.0	24.8	13.9	41.0	37.7	53.9	16.2	100	312	
Vert.	1874.858	AV	44.8	24.9	14.0	41.0	42.7	53.9	11.2	100	116	
Vert.	3001.495	AV	40.9	27.2	6.3	41.2	33.2	53.9	20.7	100	163	
Vert.	4882.000	AV	42.8	30.8	7.0	41.6	39.0	53.9	14.9	100	252	
Vert.	7323.000	AV	35.5	36.3	8.3	41.5	38.6	53.9	15.3	100	0	noise floor
Vert.	9764.000	AV	33.2	38.3	9.5	40.4	40.6	53.9	13.3	100	0	noise floor
Vert.	12201.570	AV	33.7	39.3	10.4	39.7	43.7	53.9	10.2	100	0	noise floor

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	August 16, 2014	August 27, 2014	September 3, 2014
Temperature / Humidity	25deg.C , 67%RH	24deg.C , 55%RH	25deg.C , 56%RH
Engineer	Tomochika Sato	Takahiro Suzuki	Kenichi Adachi
Mode	Tx, 2480 MHz		
	Tx, Bluetooth, BDR (DH5), PRBS9		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	72.029	QP	44.2	6.4	7.4	31.9	26.1	40.0	13.9	288	64	
Hori.	678.859	QP	42.0	20.0	8.6	31.6	39.0	46.0	7.0	130	358	
Hori.	798.758	QP	36.1	20.9	9.1	31.4	34.7	46.0	11.3	134	23	
Hori.	1750.587	PK	47.4	24.8	13.9	41.0	45.1	73.9	28.8	118	179	
Hori.	1874.831	PK	47.5	24.9	14.0	41.0	45.4	73.9	28.5	109	336	
Hori.	2483.500	PK	45.6	26.1	14.7	40.9	45.5	73.9	28.4	100	128	
Hori.	3001.574	PK	46.9	27.2	6.3	41.2	39.2	73.9	34.7	131	120	
Hori.	4960.000	PK	55.4	31.1	7.1	41.5	52.1	73.9	21.8	100	135	
Hori.	7440.000	PK	43.2	36.4	8.4	41.4	46.6	73.9	27.3	100	0	noise floor
Hori.	9920.000	PK	40.2	38.3	9.6	40.4	47.7	73.9	26.2	100	0	noise floor
Hori.	12400.000	PK	40.2	39.2	10.5	39.7	50.2	73.9	23.7	100	0	noise floor
Hori.	1750.587	AV	41.8	24.8	13.9	41.0	39.5	53.9	14.4	118	179	
Hori.	1874.831	AV	38.9	24.9	14.0	41.0	36.8	53.9	17.1	109	336	
Hori.	2483.500	AV	34.6	26.1	14.7	40.9	34.5	53.9	19.4	100	128	
Hori.	3001.574	AV	40.2	27.2	6.3	41.2	32.5	53.9	21.4	131	120	
Hori.	4960.000	AV	48.5	31.1	7.1	41.5	45.2	53.9	8.7	100	135	
Hori.	7440.000	AV	35.7	36.4	8.4	41.4	39.1	53.9	14.8	100	0	noise floor
Hori.	9920.000	AV	33.1	38.3	9.6	40.4	40.6	53.9	13.3	100	0	noise floor
Hori.	12400.000	AV	33.3	39.2	10.5	39.7	43.3	53.9	10.6	100	0	noise floor
Vert.	625.022	QP	45.9	19.3	8.3	31.7	41.8	46.0	4.2	100	48	
Vert.	758.678	QP	41.1	20.6	8.9	31.5	39.1	46.0	6.9	100	46	
Vert.	878.558	QP	43.9	22.0	9.5	31.0	44.4	46.0	**1.6**	100	155	
Vert.	918.490	QP	42.0	22.4	9.6	30.8	43.2	46.0	2.8	100	146	
Vert.	1750.587	PK	47.2	24.8	13.9	41.0	44.9	73.9	29.0	100	309	
Vert.	1874.831	PK	49.4	24.9	14.0	41.0	47.3	73.9	26.6	100	117	
Vert.	2483.500	PK	44.8	26.1	14.7	40.9	44.7	73.9	29.2	100	53	
Vert.	3001.574	PK	47.4	27.2	6.3	41.2	39.7	73.9	34.2	100	158	
Vert.	4960.000	PK	53.7	31.1	7.1	41.5	50.4	73.9	23.5	100	247	
Vert.	7440.000	PK	46.3	36.4	8.4	41.4	49.7	73.9	24.2	100	0	noise floor
Vert.	9920.000	PK	40.6	38.3	9.6	40.4	48.1	73.9	25.8	100	0	noise floor
Vert.	12400.000	PK	39.8	39.2	10.5	39.7	49.8	73.9	24.1	100	0	noise floor
Vert.	1750.587	AV	40.0	24.8	13.9	41.0	37.7	53.9	16.2	100	309	
Vert.	1874.831	AV	44.7	24.9	14.0	41.0	42.6	53.9	11.3	100	117	
Vert.	2483.500	AV	33.8	26.1	14.7	40.9	33.7	53.9	20.2	100	53	
Vert.	3001.574	AV	40.3	27.2	6.3	41.2	32.6	53.9	21.3	100	158	
Vert.	4960.000	AV	46.3	31.1	7.1	41.5	43.0	53.9	10.9	100	247	
Vert.	7440.000	AV	35.0	36.4	8.4	41.4	38.4	53.9	15.5	100	0	noise floor
Vert.	9920.000	AV	33.5	38.3	9.6	40.4	41.0	53.9	12.9	100	0	noise floor
Vert.	12400.000	AV	33.4	39.2	10.5	39.7	43.4	53.9	10.5	100	0	noise floor

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	August 16, 2014	August 28, 2014	September 3, 2014
Temperature / Humidity	25deg.C , 67%RH	24deg.C , 55%RH	25deg.C , 56%RH
Engineer	Tomochika Sato	Takahiro Suzuki	Kenichi Adachi
Mode	Tx, 2402 MHz		
	Tx, Bluetooth, EDR (3-DH5), PRBS9		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	72.043	QP	43.1	6.4	7.4	31.9	25.0	40.0	15.0	300	68	
Hori.	678.875	QP	41.2	20.0	8.6	31.6	38.2	46.0	7.8	100	281	
Hori.	798.679	QP	34.0	20.9	9.1	31.4	32.6	46.0	13.4	150	235	
Hori.	1750.760	PK	45.6	24.8	13.9	41.0	43.3	73.9	30.6	100	277	
Hori.	1875.054	PK	46.2	24.9	14.0	41.0	44.1	73.9	29.8	110	3	
Hori.	2001.113	PK	44.8	25.0	14.1	41.0	42.9	73.9	31.0	100	98	
Hori.	2390.000	PK	43.9	25.9	14.6	40.9	43.5	73.9	30.4	100	135	
Hori.	3203.585	PK	51.5	27.6	6.4	41.4	44.1	73.9	29.8	100	112	
Hori.	4804.000	PK	51.6	30.5	7.0	41.7	47.4	73.9	26.5	133	154	
Hori.	7206.000	PK	43.4	36.2	8.4	41.5	46.5	73.9	27.4	100	0	noise floor
Hori.	9608.000	PK	40.2	38.3	9.3	40.4	47.4	73.9	26.5	100	0	noise floor
Hori.	12010.000	PK	40.2	39.4	10.3	39.7	50.2	73.9	23.7	100	0	noise floor
Hori.	1750.760	AV	40.8	24.8	13.9	41.0	38.5	53.9	15.4	100	277	
Hori.	1875.054	AV	37.7	24.9	14.0	41.0	35.6	53.9	18.3	110	3	
Hori.	2001.113	AV	35.2	25.0	14.1	41.0	33.3	53.9	20.6	100	98	
Hori.	2390.000	AV	33.7	25.9	14.6	40.9	33.3	53.9	20.6	100	135	
Hori.	3203.585	AV	45.7	27.6	6.4	41.4	38.3	53.9	15.6	100	112	
Hori.	4804.000	AV	43.3	30.5	7.0	41.7	39.1	53.9	14.8	133	154	
Hori.	7206.000	AV	35.3	36.2	8.4	41.5	38.4	53.9	15.5	100	0	noise floor
Hori.	9608.000	AV	33.0	38.3	9.3	40.4	40.2	53.9	13.7	100	0	noise floor
Hori.	12010.000	AV	33.2	39.4	10.3	39.7	43.2	53.9	10.7	100	0	noise floor
Vert.	625.000	QP	46.0	19.3	8.3	31.7	41.9	46.0	**4.1**	100	48	
Vert.	758.730	QP	41.1	20.7	8.9	31.5	39.2	46.0	6.8	100	16	
Vert.	878.525	QP	41.1	22.0	9.5	31.0	41.6	46.0	4.4	100	311	
Vert.	918.645	QP	38.9	22.4	9.6	30.8	40.1	46.0	5.9	100	126	
Vert.	1750.760	PK	46.9	24.8	13.9	41.0	44.6	73.9	29.3	100	309	
Vert.	1875.054	PK	48.4	24.9	14.0	41.0	46.3	73.9	27.6	100	105	
Vert.	2001.113	PK	45.7	25.0	14.1	41.0	43.8	73.9	30.1	100	137	
Vert.	2390.000	PK	43.2	25.9	14.6	40.9	42.8	73.9	31.1	100	58	
Vert.	3203.585	PK	52.1	27.6	6.4	41.4	44.7	73.9	29.2	176	225	
Vert.	4804.000	PK	51.2	30.5	7.0	41.7	47.0	73.9	26.9	100	265	
Vert.	7206.000	PK	46.2	36.2	8.4	41.5	49.3	73.9	24.6	100	0	noise floor
Vert.	9608.000	PK	40.4	38.3	9.3	40.4	47.6	73.9	26.3	100	0	noise floor
Vert.	12010.000	PK	39.5	39.4	10.3	39.7	49.5	73.9	24.4	100	0	noise floor
Vert.	1750.760	AV	37.8	24.8	13.9	41.0	35.5	53.9	18.4	100	309	
Vert.	1875.054	AV	44.1	24.9	14.0	41.0	42.0	53.9	11.9	100	105	
Vert.	2001.113	AV	42.6	25.0	14.1	41.0	40.7	53.9	13.2	100	137	
Vert.	2390.000	AV	33.7	25.9	14.6	40.9	33.3	53.9	20.6	100	58	
Vert.	3203.585	AV	45.6	27.6	6.4	41.4	38.2	53.9	15.7	176	225	
Vert.	4804.000	AV	40.7	30.5	7.0	41.7	36.5	53.9	17.4	100	265	
Vert.	7206.000	AV	35.0	36.2	8.4	41.5	38.1	53.9	15.8	100	0	noise floor
Vert.	9608.000	AV	33.3	38.3	9.3	40.4	40.5	53.9	13.4	100	0	noise floor
Vert.	12010.000	AV	33.1	39.4	10.3	39.7	43.1	53.9	10.8	100	0	noise floor

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet **(RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.9	26.0	14.6	40.9	88.6	-	-	100k/300k
Hori.	2400.000	PK	39.3	26.0	14.6	40.9	39.0	68.6	29.6	100k/300k
Vert.	2402.000	PK	83.3	26.0	14.6	40.9	83.0	-	-	100k/300k
Vert.	2400.000	PK	36.8	26.0	14.6	40.9	36.5	63.0	26.5	100k/300k

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	August 16, 2014	August 28, 2014	September 3, 2014
Temperature / Humidity	25deg.C , 67%RH	24deg.C , 55%RH	25deg.C , 56%RH
Engineer	Tomochika Sato	Takahiro Suzuki	Kenichi Adachi
Mode	Tx, 2441 MHz		
	Tx, Bluetooth, EDR (3-DH5), PRBS9		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	72.041	QP	45.2	6.4	7.4	31.9	27.1	40.0	12.9	122	62	
Hori.	678.878	QP	42.0	20.0	8.6	31.6	39.0	46.0	7.0	100	120	
Hori.	798.752	QP	36.1	20.9	9.1	31.4	34.7	46.0	11.3	100	6	
Hori.	1750.848	PK	47.0	24.8	13.9	41.0	44.7	73.9	29.2	118	279	
Hori.	1874.741	PK	47.1	24.9	14.0	41.0	45.0	73.9	28.9	100	5	
Hori.	3001.592	PK	46.8	27.2	6.3	41.2	39.1	73.9	34.8	130	123	
Hori.	4882.000	PK	52.0	30.8	7.0	41.6	48.2	73.9	25.7	143	156	
Hori.	7323.000	PK	43.0	36.3	8.3	41.5	46.1	73.9	27.8	100	0	noise floor
Hori.	9764.000	PK	40.6	38.3	9.5	40.4	48.0	73.9	25.9	100	0	noise floor
Hori.	12205.000	PK	40.1	39.3	10.4	39.7	50.1	73.9	23.8	100	0	noise floor
Hori.	1750.848	AV	41.5	24.8	13.9	41.0	39.2	53.9	14.7	118	279	
Hori.	1874.741	AV	39.1	24.9	14.0	41.0	37.0	53.9	16.9	100	5	
Hori.	3001.592	AV	39.8	27.2	6.3	41.2	32.1	53.9	21.8	130	123	
Hori.	4882.000	AV	42.9	30.8	7.0	41.6	39.1	53.9	14.8	143	156	
Hori.	7323.000	AV	35.4	36.3	8.3	41.5	38.5	53.9	15.4	100	0	noise floor
Hori.	9764.000	AV	33.2	38.3	9.5	40.4	40.6	53.9	13.3	100	0	noise floor
Hori.	12205.000	AV	33.3	39.3	10.4	39.7	43.3	53.9	10.6	100	0	noise floor
Vert.	625.066	QP	45.3	19.3	8.3	31.7	41.2	46.0	4.8	100	60	
Vert.	758.818	QP	42.1	20.7	8.9	31.5	40.2	46.0	5.8	100	223	
Vert.	878.563	QP	39.5	22.0	9.5	31.0	40.0	46.0	6.0	100	314	
Vert.	918.572	QP	41.2	22.4	9.6	30.8	42.4	46.0	**3.6**	100	114	
Vert.	1750.848	PK	46.7	24.8	13.9	41.0	44.4	73.9	29.5	100	300	
Vert.	1874.741	PK	49.1	24.9	14.0	41.0	47.0	73.9	26.9	100	103	
Vert.	3001.592	PK	47.2	27.2	6.3	41.2	39.5	73.9	34.4	100	155	
Vert.	4882.000	PK	49.2	30.8	7.0	41.6	45.4	73.9	28.5	100	253	
Vert.	7323.000	PK	45.9	36.3	8.3	41.5	49.0	73.9	24.9	100	0	noise floor
Vert.	9764.000	PK	40.6	38.3	9.5	40.4	48.0	73.9	25.9	100	0	noise floor
Vert.	12205.000	PK	39.9	39.3	10.4	39.7	49.9	73.9	24.0	100	0	noise floor
Vert.	1750.848	AV	39.6	24.8	13.9	41.0	37.3	53.9	16.6	100	300	
Vert.	1874.741	AV	44.6	24.9	14.0	41.0	42.5	53.9	11.4	100	103	
Vert.	3001.592	AV	40.0	27.2	6.3	41.2	32.3	53.9	21.6	100	155	
Vert.	4882.000	AV	39.8	30.8	7.0	41.6	36.0	53.9	17.9	100	253	
Vert.	7323.000	AV	35.0	36.3	8.3	41.5	38.1	53.9	15.8	100	0	noise floor
Vert.	9764.000	AV	33.4	38.3	9.5	40.4	40.8	53.9	13.1	100	0	noise floor
Vert.	12205.000	AV	33.5	39.3	10.4	39.7	43.5	53.9	10.4	100	0	noise floor

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	August 16, 2014	August 28, 2014	September 3, 2014
Temperature / Humidity	25deg.C , 67%RH	24deg.C , 55%RH	25deg.C , 56%RH
Engineer	Tomochika Sato	Takahiro Suzuki	Kenichi Adachi
Mode	Tx, 2480 MHz		
	Tx, Bluetooth, EDR (3-DH5), PRBS9		

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	72.037	QP	45.0	6.4	7.4	31.9	26.9	40.0	13.1	223	59	
Hori.	678.881	QP	42.9	20.0	8.6	31.6	39.9	46.0	6.1	150	247	
Hori.	798.752	QP	36.5	20.9	9.1	31.4	35.1	46.0	10.9	150	188	
Hori.	1750.583	PK	46.8	24.8	13.9	41.0	44.5	73.9	29.4	112	185	
Hori.	1875.061	PK	47.2	24.9	14.0	41.0	45.1	73.9	28.8	115	344	
Hori.	2483.500	PK	49.8	26.1	14.7	40.9	49.7	73.9	24.2	100	131	
Hori.	3001.798	PK	46.6	27.2	6.3	41.2	38.9	73.9	35.0	129	126	
Hori.	4960.000	PK	52.2	31.1	7.1	41.5	48.9	73.9	25.0	100	136	
Hori.	7440.000	PK	43.0	36.4	8.4	41.4	46.4	73.9	27.5	100	0	noise floor
Hori.	9920.000	PK	40.4	38.3	9.6	40.4	47.9	73.9	26.0	100	0	noise floor
Hori.	12400.000	PK	40.4	39.2	10.5	39.7	50.4	73.9	23.5	100	0	noise floor
Hori.	1750.583	AV	41.3	24.8	13.9	41.0	39.0	53.9	14.9	112	185	
Hori.	1875.061	AV	38.3	24.9	14.0	41.0	36.2	53.9	17.7	115	344	
Hori.	2483.500	AV	36.6	26.1	14.7	40.9	36.5	53.9	17.4	100	131	
Hori.	3001.798	AV	39.7	27.2	6.3	41.2	32.0	53.9	21.9	129	126	
Hori.	4960.000	AV	43.3	31.1	7.1	41.5	40.0	53.9	13.9	100	136	
Hori.	7440.000	AV	35.4	36.4	8.4	41.4	38.8	53.9	15.1	100	0	noise floor
Hori.	9920.000	AV	33.0	38.3	9.6	40.4	40.5	53.9	13.4	100	0	noise floor
Hori.	12400.000	AV	33.5	39.2	10.5	39.7	43.5	53.9	10.4	100	0	noise floor
Vert.	625.032	QP	47.2	19.3	8.3	31.7	43.1	46.0	**2.9**	100	55	
Vert.	758.813	QP	40.1	20.7	8.9	31.5	38.2	46.0	7.8	100	113	
Vert.	878.560	QP	40.5	22.0	9.5	31.0	41.0	46.0	5.0	100	195	
Vert.	918.469	QP	40.2	22.4	9.6	30.8	41.4	46.0	4.6	100	110	
Vert.	1750.583	PK	46.7	24.8	13.9	41.0	44.4	73.9	29.5	100	298	
Vert.	1875.061	PK	49.0	24.9	14.0	41.0	46.9	73.9	27.0	100	115	
Vert.	2483.500	PK	45.2	26.1	14.7	40.9	45.1	73.9	28.8	100	53	
Vert.	3001.798	PK	46.9	27.2	6.3	41.2	39.2	73.9	34.7	100	155	
Vert.	4960.000	PK	49.0	31.1	7.1	41.5	45.7	73.9	28.2	100	242	
Vert.	7440.000	PK	46.6	36.4	8.4	41.4	50.0	73.9	23.9	100	0	noise floor
Vert.	9920.000	PK	40.7	38.3	9.6	40.4	48.2	73.9	25.7	100	0	noise floor
Vert.	12400.000	PK	39.7	39.2	10.5	39.7	49.7	73.9	24.2	100	0	noise floor
Vert.	1750.583	AV	39.8	24.8	13.9	41.0	37.5	53.9	16.4	100	298	
Vert.	1875.061	AV	44.4	24.9	14.0	41.0	42.3	53.9	11.6	100	115	
Vert.	2483.500	AV	34.8	26.1	14.7	40.9	34.7	53.9	19.2	100	53	
Vert.	3001.798	AV	39.8	27.2	6.3	41.2	32.1	53.9	21.8	100	155	
Vert.	4960.000	AV	41.3	31.1	7.1	41.5	38.0	53.9	15.9	100	242	
Vert.	7440.000	AV	35.2	36.4	8.4	41.4	38.6	53.9	15.3	100	0	noise floor
Vert.	9920.000	AV	33.8	38.3	9.6	40.4	41.3	53.9	12.6	100	0	noise floor
Vert.	12400.000	AV	33.6	39.2	10.5	39.7	43.6	53.9	10.3	100	0	noise floor

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

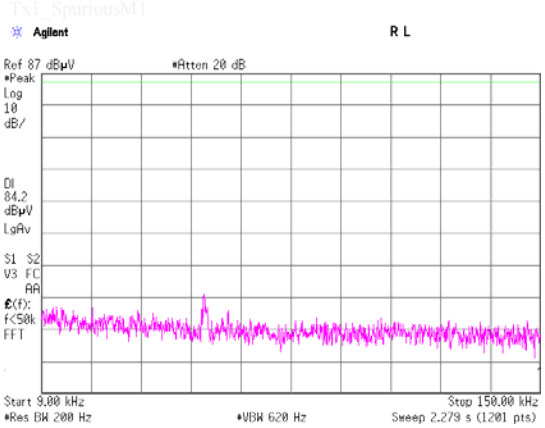
Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	

Spurious emission (Conducted)

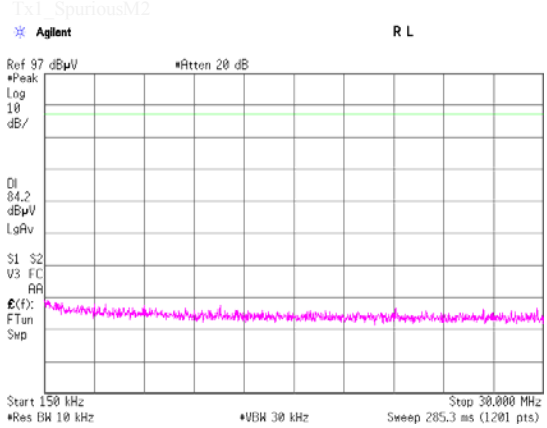
Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 30MHz)

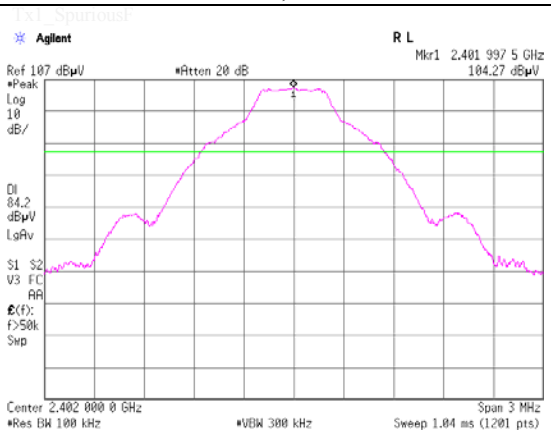
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



UL Japan, Inc.
Shonan EMC Lab.
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Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

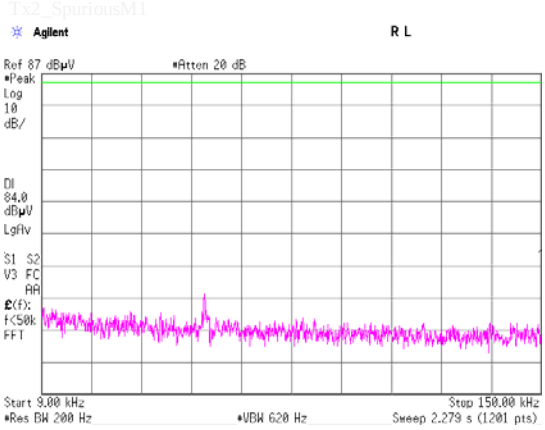
Test place	UL Japan, Inc. Shonan EMC Lab.	No.2 Measurement Room
Date	August 14, 2014	
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	

Spurious emission (Conducted)

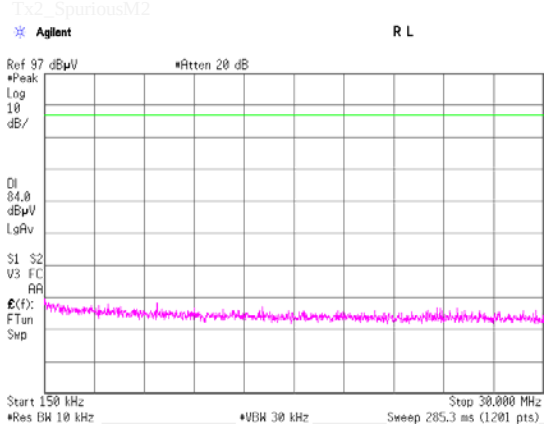
Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 30MHz)

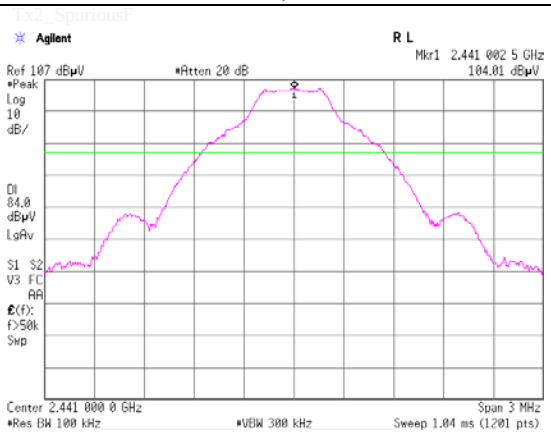
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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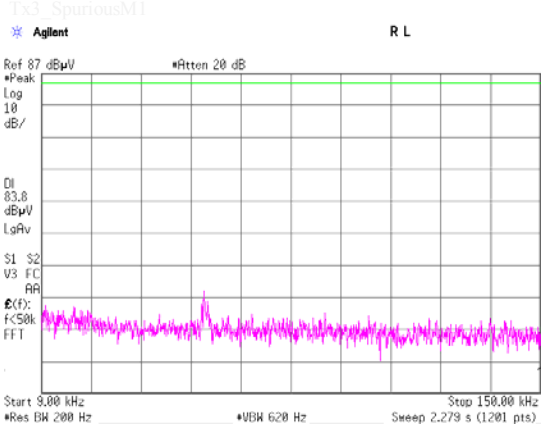
Engineer	Hikaru Shirasawa	

Spurious emission (Conducted)

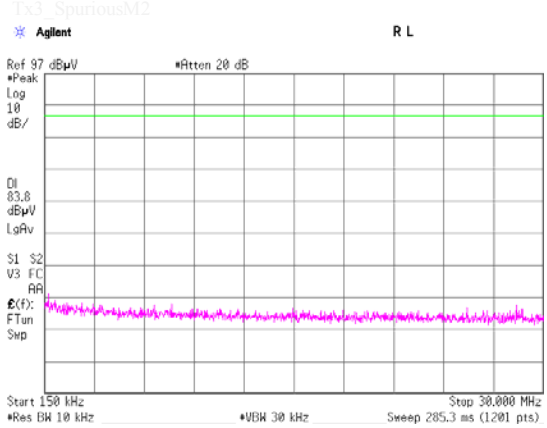
Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 30MHz)

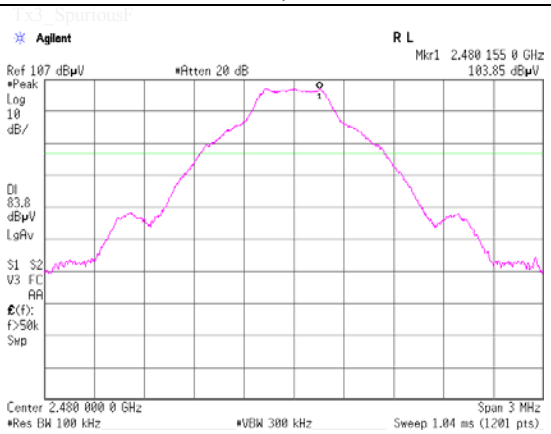
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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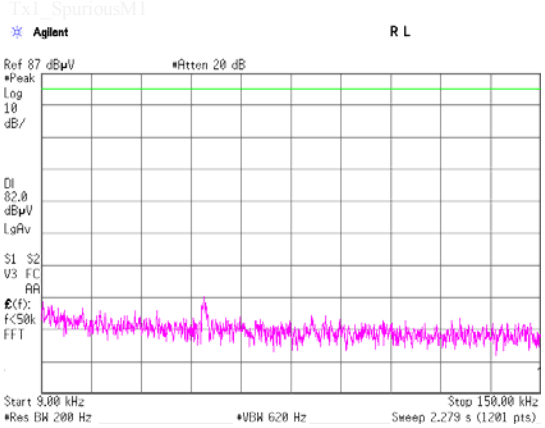
Engineer	Hikaru Shirasawa	

Spurious emission (Conducted)

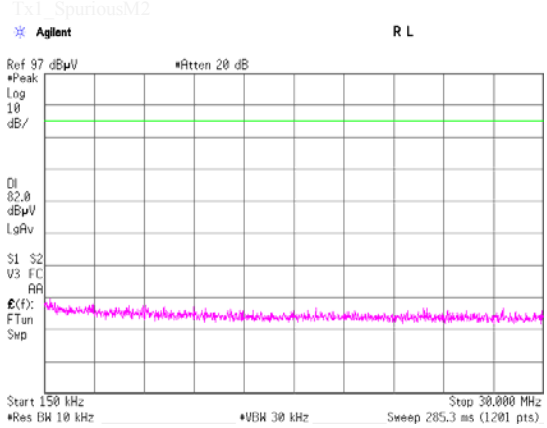
Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 30MHz)

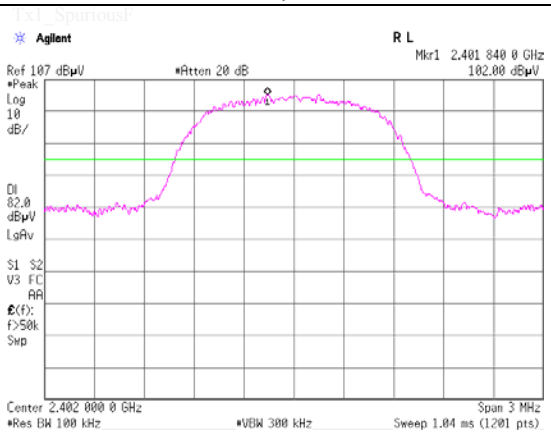
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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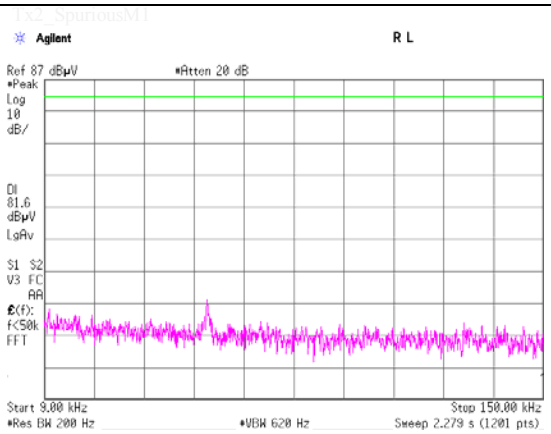
Engineer	Hikaru Shirasawa	

Spurious emission (Conducted)

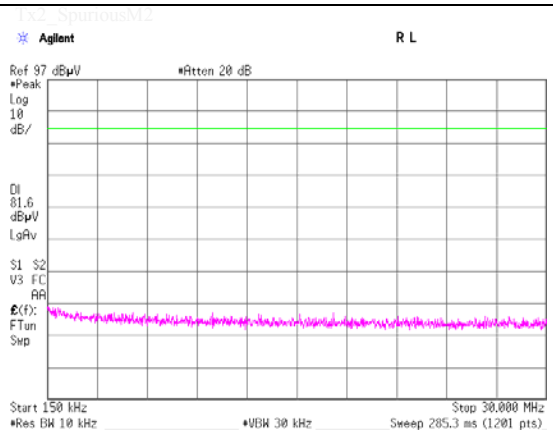
Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 30MHz)

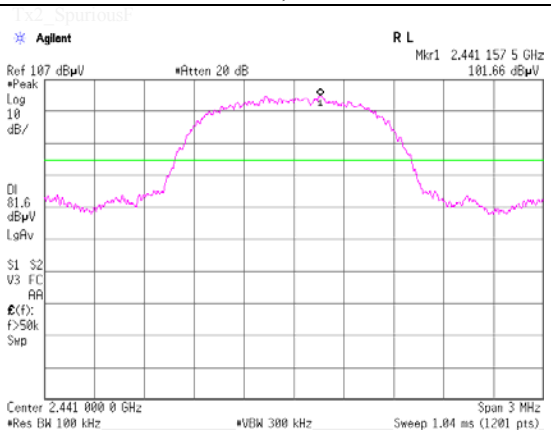
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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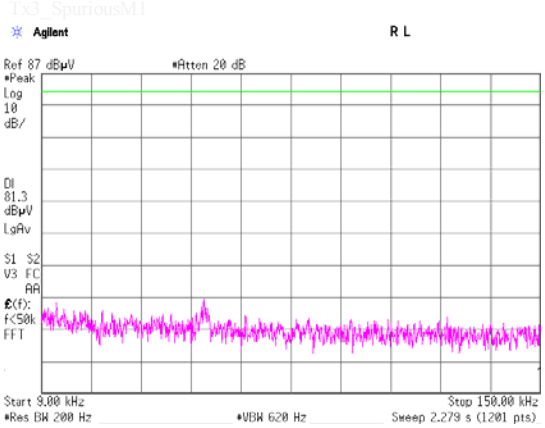
Engineer	Hikaru Shirasawa	

Spurious emission (Conducted)

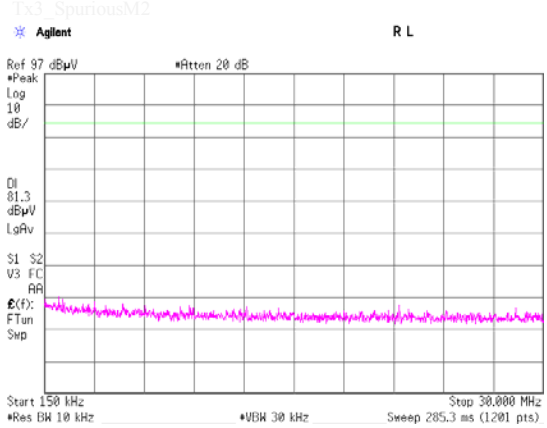
Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 30MHz)

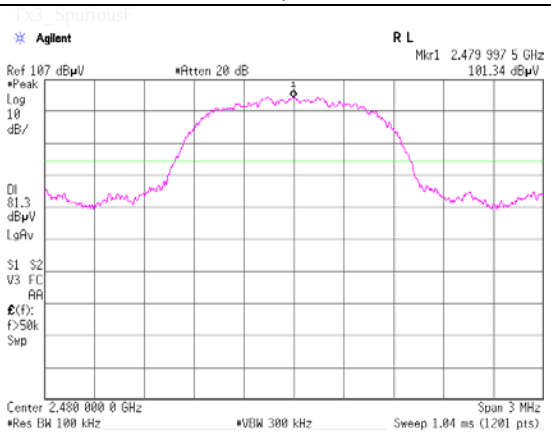
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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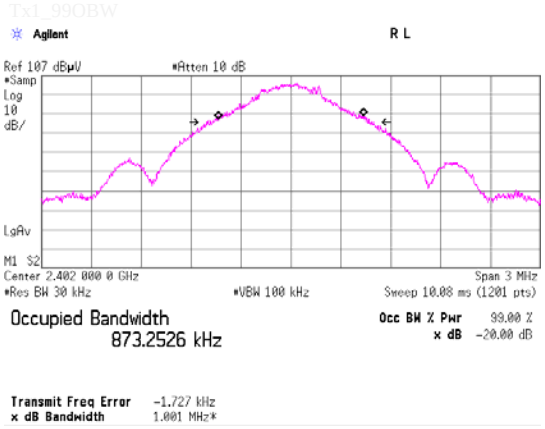
Temperature / Humidity	26 deg.C , 63 %RH	
Engineer	Hikaru Shirasawa	

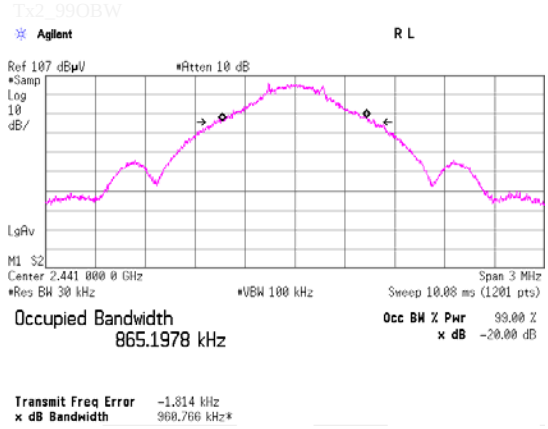
99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9

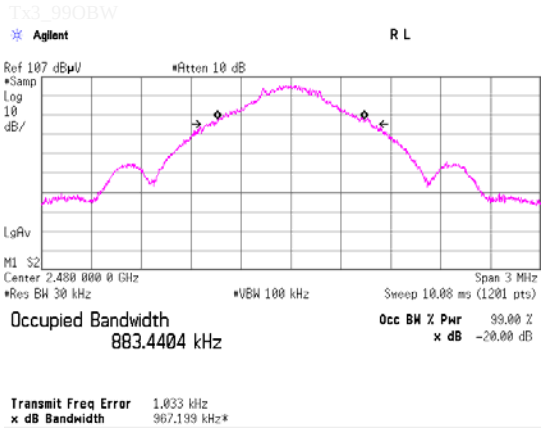
Tx, 2402MHz



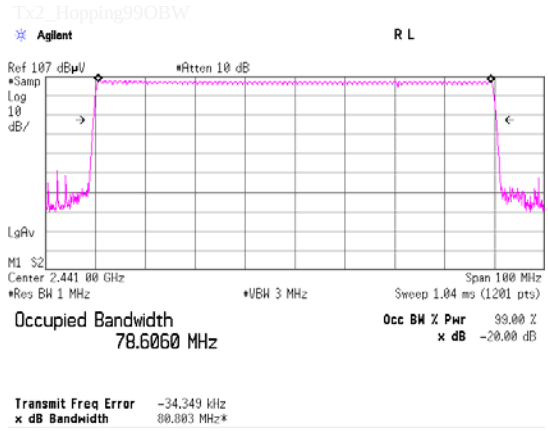
Tx, 2441MHz



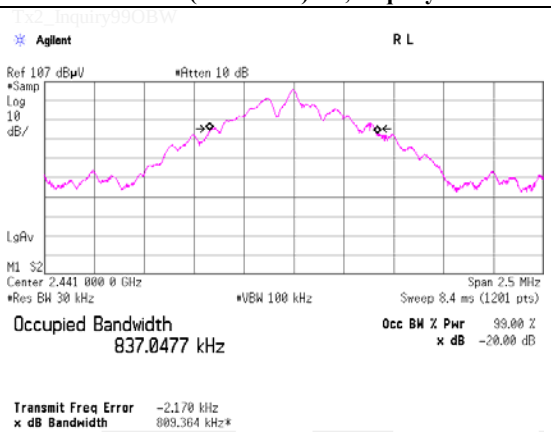
Tx, 2480MHz



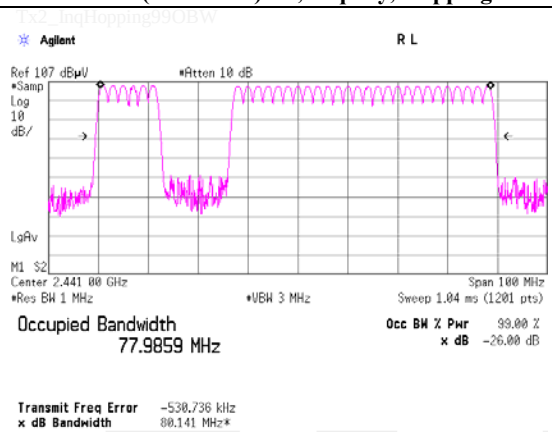
Tx, Hopping On



(Reference) Tx, Inquiry



(Reference) Tx, Inquiry, Hopping



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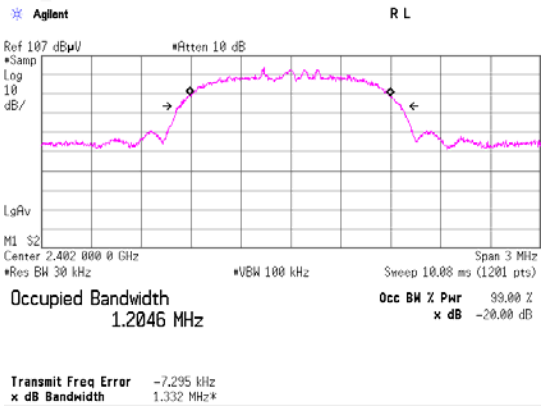
Temperature / Humidity	26 deg.C , 62 %RH	
Engineer	Hikaru Shirasawa	

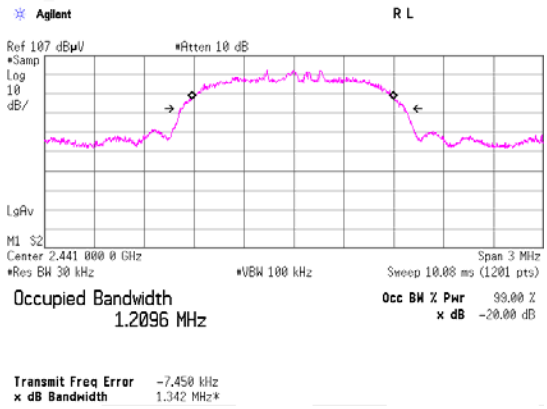
99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9

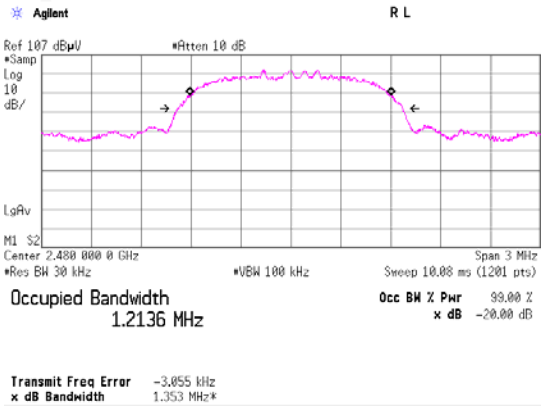
Tx, 2402MHz



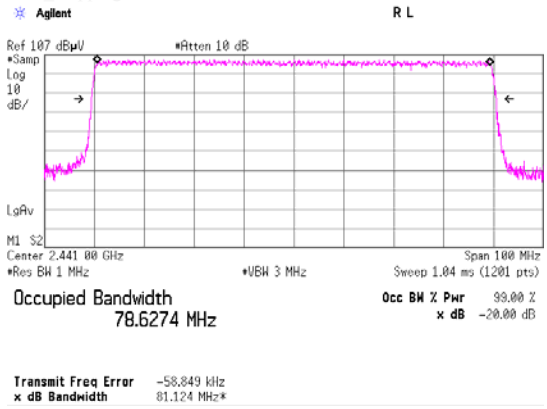
Tx, 2441MHz



Tx, 2480MHz



Tx, Hopping On



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2014/03/17 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2014/04/08 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2014/04/08 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2014/04/22 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2014/03/13 * 12
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2014/04/22 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2014/02/17 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2014/02/17 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2014/08/27 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2013/11/24 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2014/04/25 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2014/04/25 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2013/11/24 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2014/02/21 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2014/02/18 * 12
SJM-14	Measure	ASKUL	-	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2014/07/08 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE,CE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2014/07/09 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2014/03/14 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2014/04/22 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2014/05/15 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2014/08/12 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2014/02/21 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2014/03/04 * 12
SJM-13	Measure	ASKUL	-	-	RE,CE	-
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2014/04/22 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2013/11/22 * 12
SCC-A12/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2014/04/25 * 12
SLS-01	LISN	Rohde & Schwarz	ENV216	100511	CE	2014/02/14 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2014/02/17 * 12
SOS-02	Humidity Indicator	A&D	AD-5681	4063343	CE	2014/03/07 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	CE	2013/11/20 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
CE: Conducted emission ,
RE: Radiated emission ,
AT: Antenna terminal conducted tests ,

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2014/07/14 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2014/08/12 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2014/06/24 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2013/11/22 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2014/05/23 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2014/05/15 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2014/04/07 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/02/21 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2014/03/15 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2014/05/15 * 12
SCC-G18	Coaxial Cable	Suhner	SUCOFLEX 104A	46292/4A	RE	2014/03/14 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .
All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
CE: Conducted emission ,
RE: Radiated emission ,
AT: Antenna terminal conducted tests ,